H900-S HIGH PERFORMANCE VECTOR INVERTER USER MANUAL

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Chapter 1 Safety Information

1.1 Safety Information Symbols and Definitions

The safety clauses described in this user manual are very important. When using the inverter, you should prevent yourself or people around you from being injured and property in the work area from being damaged. Please be fully familiar with the following icons and their meanings, and be sure to follow the precautions marked to ensure your safety before continuing to read this user manual.

This symbol indicates that failure to follow the instructions may result in death or serious injury.

This symbol indicates that failure to follow the instructions may result in moderate personal injury or minor injury and certain material losses.

This symbol indicates matters that require attention during operation or use.。

This symbol prompts the user with some useful information

The following two icons are supplementary explanations of the above signs

Things that absolutely cannot be done

Indicates things that must be done。

1.2 Scope of use

CAUTION

This inverter is suitable for general industrial three-phase AC asynchronous motors.

WARN

● This inverter cannot be used in equipment that may threaten life or harm the human body due to inverter failure or working errors (nuclear power control equipment, aerospace equipment, transportation equipment, life support systems, safety equipment, weapon systems, etc.). If it is required for special purposes, please consult our company in advance.

● This product is manufactured under the supervision of a strict quality management system, but when used in important equipment, safety protection measures must be taken to prevent the scope of the accident from expanding when the inverter fails.

1.3 Installation Environment

● Install indoors in a well-ventilated place. Generally, it should be installed vertically to ensure the best cooling effect. When installed horizontally, additional ventilation devices may be required.

● The ambient temperature is required to be within the range of -10 to 40 ° C. If the temperature exceeds 40 ° C, please remove the upper cover. If it exceeds 50 ° C, external forced cooling or derating is required. It is recommended that users do not use the inverter in such a high temperature environment, as this will greatly reduce the service life of the inverter.

● The ambient humidity should be lower than 90% with no condensation.

● Install in a place where the vibration is less than 0.5G to prevent damage from falling. Do not allow the inverter to be subjected to sudden impact.

● Install in an environment away from electromagnetic fields and free of flammable and explosive substances.

1.4 Installation Safety Matters

DANGER

- It is strictly forbidden to operate with wet hands.
- It is strictly forbidden to carry out wiring work when the power supply is not completely disconnected.
- When the inverter is powered on and running, do not open the cover or perform wiring operations, otherwise there is a risk of electric shock.
- When performing wiring, inspection and other operations, the work must be done 10 minutes after turning off the power supply, otherwise there is a risk of electric shock.

WARN

- Do not install or use the inverter with damaged or missing components to prevent personal accidents and property losses.

The main circuit terminals and cables must be firmly connected. Otherwise, the inverter may be damaged due to poor contact.

- For safety reasons, the grounding terminal of the inverter must be reliably grounded to avoid the influence of grounding common impedance interference. The grounding of multiple inverters should adopt the single-point grounding method, as shown in Figure 1-1 .

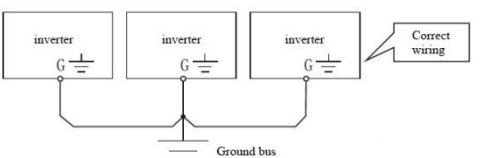


figure 1-1

● It is strictly forbidden to connect the AC power supply to the inverter output terminals U , V , W , otherwise it will cause damage to the inverter, as shown in Figure 1-2 .

● On the input power side of the inverter, be sure to configure a non-fuse circuit breaker for circuit protection to prevent the expansion of accidents caused by inverter failure.

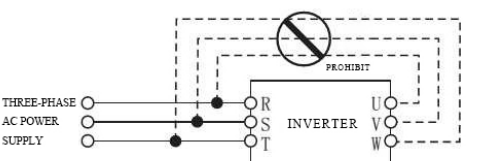


figure 1 – 2

● It is not advisable to install electromagnetic contactor on the output side of the inverter. This is because the contactor will be switched on and off when the motor is running, which will generate operating overvoltage and damage the inverter. However, it is still necessary to configure it for the following three situations:

The frequency converter used for energy-saving control is used when the system often operates at the rated speed. In order to achieve economical operation,

the frequency converter needs to be cut off.

When involved in important process flows, cannot be shut down for long periods of time, and need to switch between various control systems to improve system reliability.

When one inverter controls multiple motors, users should note that the contactor should not operate when the inverter has output!

1.5 Safety precautions

● It is strictly forbidden to operate with wet hands.

● For inverters that have been stored for more than 1 year, the voltage should be gradually increased to the rated value using a voltage regulator when powered on, otherwise there is a risk of electric shock and explosion.

● Do not touch the inside of the inverter after power-on. Do not put rods or other objects into the inverter, otherwise it may cause electric shock or the inverter may not work properly.

● When the inverter is powered on, please do not open the cover. Otherwise there is a risk of electric shock.

● Use the power-off restart function with caution, otherwise it may cause personal injury or death.

● If the operation exceeds 50Hz , the speed range of the motor bearings and mechanical devices must be ensured.

● Mechanical devices that require lubrication, such as reduction gears and gears, should not be run at low speeds for a long time, otherwise their service life will be reduced or even the equipment will be damaged.

● When ordinary motors run at low frequencies, the heat dissipation effect becomes poor and they must be used at a reduced rating. If the load is constant torque, forced heat dissipation or a dedicated frequency conversion motor must be used.

● If the inverter is not used for a long time, please be sure to cut off the input power to avoid damage to the inverter or even fire due to foreign objects entering or other reasons.

● Since the output voltage of the inverter is a PWM pulse wave, please do not install capacitors or surge current absorbers (such as varistor) at its output end, otherwise it will cause the inverter to trip or even damage the power components. If they have been installed, please be sure to remove them. See Figure 1-3 .

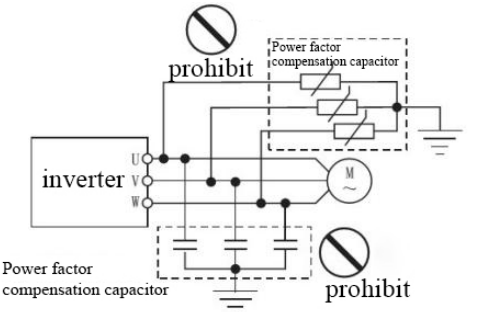


figure 1－3

CAUTION

● Before using the motor for the first time or reusing it after being stored for a long time, the motor insulation should be checked and the measured insulation resistance should be ensured to be no less than 5MΩ .

● If you need to use the inverter outside the allowable operating voltage range, you need to configure a step-up or step-down device for voltage conversion.

● In areas with an altitude of more than 1000 meters, the heat dissipation effect of the inverter will become worse due to the thin air, and it needs to be derated. Generally, the derate needs to be reduced by about 10% for every 1000m increase in altitude. See Figure 1-4 for the derating curve .

Chapter 2 Product Standard Specifications

2.1 Technical Specifications

enter	Rated voltage, frequency	Three-phase AC 380V; 50/60Hz Single phase AC220 V; 50/60Hz	
	Voltage allowed Range of change	Three - phase AC 380V ~ 480V Single-phase AC220 V ~ 260 V	
Output	Voltage	0 ~ 480V 0 ~ 260V	
	frequency	Vector control: 0~500Hz V/F control: 0~5000Hz	
	Overload capacity	G type machine: 150% rated current for 60s; 180% rated current for 3s. P-type machine: 120% rated current for 60s; 150% rated current for 3s.	
Control method		V/F control, speed sensorless vector control (SVC)	
Control characteristics	Frequency setting Resolution	Analog input	Maximum frequency×0.025%
		Digital settings	0.01Hz
	V/F control	V/F Curve	Three types: linear type; multi-point type; N-th power type V/F curve (1.2, 1.4, 1.6, 1.8, 2)
		V/F separation	2 methods: full separation, semi-separation
		Torque boost	Manual setting: 0.0~30.0% of rated output Automatic boost: Automatically determine boost torque based on output current and motor parameters
		Automatic current and voltage limiting	Whether in acceleration, deceleration or stable operation, it can automatically detect the motor stator current and voltage, and suppress them within the allowable range based on a unique algorithm, minimizing the possibility of system fault tripping.
Control characteristics	Sensorless vector control	Voltage frequency characteristics	Automatically adjust the output voltage-frequency ratio according to motor parameters and unique algorithm

		Torque characteristics	Starting torque: 150% rated torque at 3.0Hz (V/F control) 150% rated torque at 0.5Hz (speed sensorless vector control) Operating speed steady-state accuracy: ≤±0.2% rated synchronous speed Speed fluctuation: ≤±0.5% rated synchronous speed Torque response: ≤20ms (speed sensorless vector control)
		Motor parameter self-determination	Without any restrictions, the automatic detection of parameters can be completed in both static and dynamic conditions of the motor to obtain the best control effect
		Current and voltage suppression	Full current closed-loop control, completely avoiding current shock, with perfect over-current and over-voltage suppression function
	Undervoltage suppression during operation	Especially for users with low grid voltage or frequent grid voltage fluctuations, the system can maintain the longest possible operating time based on unique algorithms and residual energy allocation strategies even when the voltage is below the allowable range.	
Typical functions	Multi-speed and swing frequency operation	16-segment programmable multi-speed control, multiple operating modes optional. Swing frequency operation: preset frequency, center frequency adjustable, state memory and recovery after power failure	
	PID Control RS485 Communication	Built-in PID controller (preset frequency), standard configuration RS485 communication function	
	Frequency setting	Analog Input	DC voltage 0~10V, DC current 0~20mA (upper and lower limits are optional)
		Digital Input	Operation panel setting, RS485 interface setting, UP/DOWN terminal control, and multiple combination settings with analog input
	Output signal	Digital Output	2-way Y-terminal open collector output and 2-way programmable relay output (TA, TB, TC), up to 58 meaning options
		Analog Output	2-way analog signal output, the output range is flexibly set between 0~20mA or 0~10V, which can realize the output of physical quantities such as set frequency and output frequency
	Automatic voltage stabilization operation	According to the needs, you can choose dynamic voltage stabilization, static voltage stabilization, and non-stabilization to obtain the most stable operation effect.	

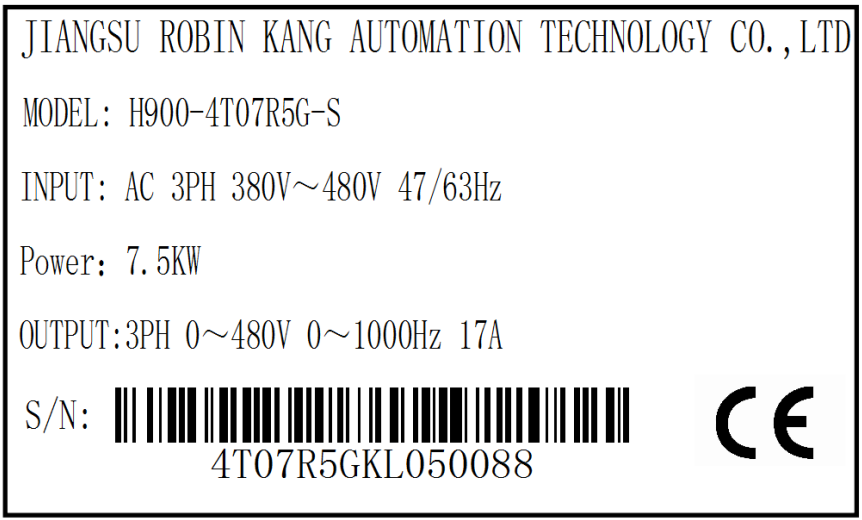
	Acceleration and deceleration Time setting		0.0s～6500.0s can be set continuously, S-shaped and linear modes are optional
	brake	Energy consumption brake	Dynamic braking starting voltage, hysteresis voltage and dynamic braking rate can be adjusted continuously
		DC brake	DC braking start frequency at shutdown: 0.00～[F00.10] maximum frequency Braking time: 0.0～100.0s; Braking current: 0%～100% rated current
	Low noise operation		The carrier frequency is continuously adjustable from 0.5KHz to 16.0KHz to minimize motor noise
	Speed tracking speed Restart function		It can realize the smooth restart and instantaneous stop restart function of the running motor
	counter		One internal counter for easy system integration
	Run function		Upper and lower frequency limit setting, frequency jump operation, reverse operation limit, slip frequency compensation, RS485 communication, frequency increase and decrease control, fault self-recovery operation, etc.

show	Operation panel display	run state	Output frequency, output current, output voltage, motor speed, set frequency, module temperature, PID setting, feedback, analog input and output, etc.
		Call the police content	There are eight operating parameter records including output frequency, set frequency, output current, output voltage, DC voltage, module temperature, power-on time, and operating time when three fault trips occur.
Protection function			Overcurrent, overvoltage, undervoltage, module failure, electronic thermal relay, overheating, short circuit, input and output phase loss, abnormal motor parameter tuning, internal memory failure, etc.
environment	Ambient temperature		-10℃～＋40℃ (When the ambient temperature is 40℃～50℃, please use it at a reduced rating)
	Ambient humidity		5%～95%RH, no condensation
	Surroundings		Indoors (no direct sunlight, no corrosion, no flammable gas, no oil mist, dust, etc.)

	altitude	Derate for use above 1000 meters, 10% for every 1000 meters increase
structure	Protection level	IP20
	Cooling method	Air cooling, with fan control
Installation		Wall-mounted

2.2 Inverter model description

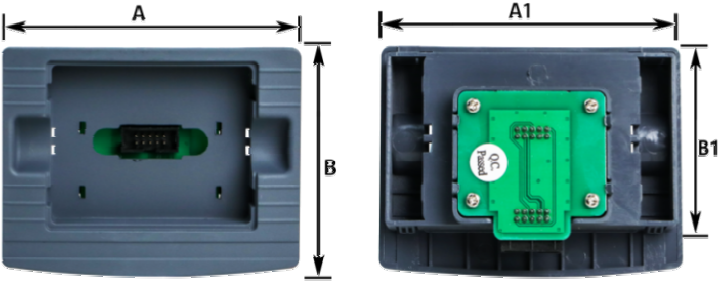
Voltage level	Rated power (KW)	Rated output current (A)	Applicable motor (KW)
Single phase 220V	0.75	4.5	0.75
	1.5	7.0	1.5
	2.2	10	2.2
Three-phase 380V	0.75	2.5	0.75
	1.5	3.7	1.5
	2.2	5	2.2
	4.0	9	4
	5.5	13	5.5
	7.5	17	7.5
	11	25	11
	15	32	15
	18.5	37	18.5
	22	45	22


JIANGSU ROBIN KANG AUTOMATION TECHNOLOGY CO.,LTD
MODEL: H900-4T07R5G-S
INPUT: AC 3PH 380V～480V 47/63Hz
Power: 7.5KW
OUTPUT:3PH 0～480V 0～1000Hz 17A
S/N:
4T07R5GKL050088
CE

2.3 Chassis and keyboard dimensions

2.3.1 Keyboard dimensions

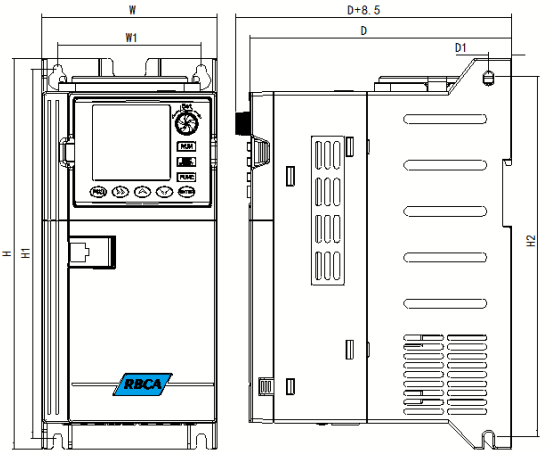
2.3.2 External keyboard opening dimensions



Dimensions (mm)		Opening size (mm)	
A	B	A1	B1
105	81	100.5	60

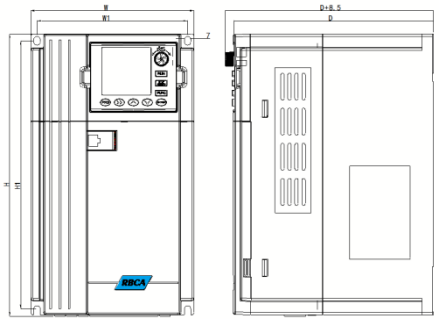
2.4 Product Appearance

A. Dimensions and installation dimensions 1 frame type (unit : mm) 0.75-5.5Kw



Voltage level	Inverter Model	Power(kw)	Dimensions (mm)			Installation size (mm)			Packing size (mm)			Net weight (kg)	
			W	H	D	W1	H1	Φ	long	Width	high		
Three-phase 380V	H900-S4TR75G	0.75	78	170	125	60	160	5	200	115	175	1.1	Dimensions
	H900-S4T01R5G	1.5										1.1	
	H900-S4T02R2G	2.2										1.3	
	H900-S4T0004G	4.0	95	212	144	78	198	5	258	140	184	1.4	
	H900-S4T05R5G	5.5										1.5	

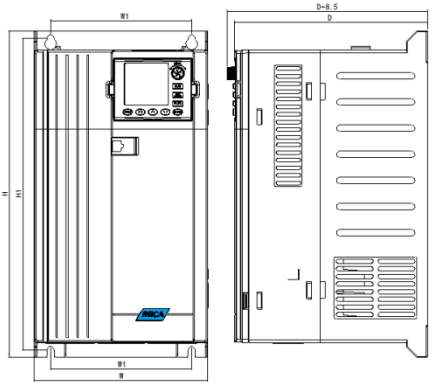
B. Product dimensions and installation dimensions 2 frame type (unit： ㎜) 7.5-11Kw



Voltage level	Inverter Model	Power (kw)	Dimensions (mm)			Installation size (mm)			Packing size (mm)			Net weight (kg)	Dimensions
			W	H	D	W1	H1	Φ	long	Width	high		
380V three-phase	H900-S 4T07R5G	7.5	140	240	175	129	229	5.5	280	180	220	3.18	Frame Type 2
	H900-S 4T0011G	11										3.2	

C. Product dimensions and installation dimensions Frame type 3 (unit: mm) 15-22Kw

Voltage level	Inverter Model	Power(kw)	Dimensions (mm)			Installation size (mm)		Packing size (mm)				Net weight (kg)	Dimensions	
			W	H	D	W1	H1	Φ	long	Width	high			
380V three-phase	H900-S 4T0015G	15	166	312	185.5	135	298	7	387	250	270	4.92	Frame Type 3	
	H900-S 4T18R5G	18.5										4.92		
	H900-S 4T0022G	twenty two										4.95		



2.5 Braking resistor selection table

Voltage (V)	Inverter power (kW)	Braking resistor specifications		Braking torque
		W	Ω	10%ED
Three-phase 380V	0.75	100	≥ 750	125
	1.5	300	≥ 400	125
	2.2	300	≥ 150	125
	4	400	≥ 10 0	125
	5.5	5 00	≥ 10 0	125
	7.5	10 00	≥ 75	125

Voltage (V)	Inverter power (kW)	Braking resistor specifications		Braking torque
		W	Ω	10%ED
	11	30 00	≥43	125
	15	3 000	≥32	125
	18.5	30 00	≥25	125
	22	40 00	≥ 2 2	125

Notice:

1. Please select the resistance value specified by our company.
2. If the use of brake resistors other than those provided by our company causes damage to the inverter or other equipment, our company will not bear any responsibility.
3. When installing the brake resistor, be sure to consider the safety and flammability of the environment and keep it at least 100mm away from the inverter .
4. The parameters in the table are for reference only and are not used as standards.

Chapter 3 Storage and installation

3.1 Storage

This product must be placed in the packaging box before installation. If it is not used temporarily, please pay attention to the following points when storing it:

- Must be placed in a dust-free, dry location;
- Storage environment temperature ranges from -20 ℃ to +65 ℃;
- The relative humidity of the storage environment is within the range of 0% to 95% with no condensation;
- The storage environment does not contain corrosive gases or liquids;
- It is best to place it on a shelf and store it in a well-packaged manner. It is best not to store the inverter for a long time. Long-term storage will cause the electrolytic capacitor to deteriorate. If it needs to be stored for a long time, it must be powered on once every six months for at least 5 hours. When inputting, the voltage must be slowly increased to the rated voltage value using a voltage regulator.

3.2 Installation location and environment

Note: The environment of the installation site will affect the service life of the inverter. Please install the inverter in the following places:

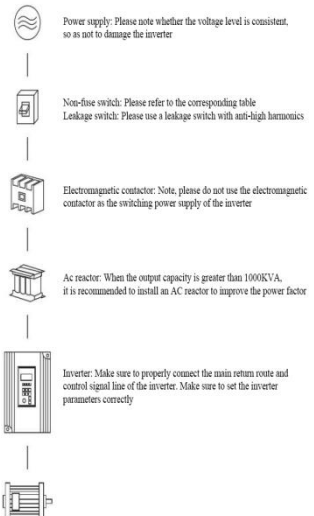
- Ambient temperature: -5 ～ 40 ℃ ℃ and good ventilation;
- A place without dripping water and low temperature;
- Places without sunlight, high temperature and severe dust;
- A place without corrosive gases and liquids;
- A place with less dust, oil gas and metal powder;
- A place without vibration, easy to maintain and inspect;
- A place without electromagnetic noise interference;

3.3 Installation space and direction

- For the convenience of maintenance, there should be enough space around the inverter, as shown in the figure.
- To achieve good cooling effect, the inverter must be installed vertically and ensure smooth air circulation.
- If the installation is not firm, place a flat plate under the inverter base before installation. If it is installed on a loose surface, the stress may cause damage to the main circuit parts, thus damaging the inverter;
- The wall surface for installation should be made of non-combustible materials such as iron plate.
- When multiple inverters are installed in the same cabinet, use the method of up and down installation. While paying attention to the spacing , please add a guide partition in the middle or install them in an up and down staggered manner.

Chapter 4 Wiring

4.1 Main circuit wiring diagram



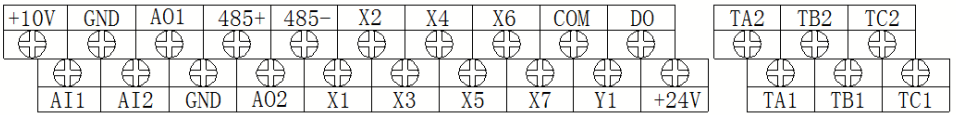
4.2 Terminal diagram

4.2.1 The functions of the main circuit terminals are as follows :

Terminal name	Function description
R、S、T	Three-phase power input terminal
P+ 、P-	External brake unit reserved terminals
P+ 、PB	Reserved terminal for external brake resistance
P+、P1	Reserved terminal for external DC reactor
U、V、W	Three-phase AC output terminal
⏚	Ground terminal

4.2.2 Control circuit terminals

H 900 -S 0.75 kW - 22 kW



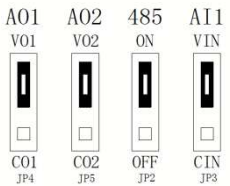
Control circuit terminal function description

category	Terminal number	Functional Description	Specification
Multi-function digital input terminal	X1	It is effective when X (X1, X2, X3, X4, X5, X6, X7) ~ COM are short-circuited, and its functions are set by parameters F07.00 ~ F07.06 respectively (common terminal: COM).	INPUT, 0~24V level signal, low level is effective, 5mA.
	X2		
	X3		
	X4		
	X5		
	X6		
	X7	In addition to being used as a common multi-function terminal, X7 can also be programmed as a high-speed pulse input port. For details, see the F07.06 function description.	
Analog input and output terminals	AI1	AI1 receives analog voltage/current input. Voltage and current are selected by jumper JP3. The factory default input voltage. If you want to input current, just adjust the jumper cap to the Cin position; AI2 only receives voltage input. For range setting, see the description of function code F07.13~F07.22. (Reference ground: GND)	INPUT, input voltage range: 0~10V (input impedance: 100KΩ), input current range: 0~20mA (input impedance: 500Ω).
	AI2		
	AO1	AO1 provides analog voltage/current output, which can represent 16 physical quantities. The output voltage and current are selected by jumper JP4. The factory default output voltage is set. If you want to output current, just jump the jumper cap to Col position; see the function code	OUTPUT, 0~10V DC voltage. The output voltage of AO1 and AO2 terminals is the PWM waveform from the CPU. The output voltage is proportional to the width of the PWM waveform.
	AO2		

		F08.07 and F08.08 for details. (Reference ground: GND)	
Relay output	TA1	Programmable and defined as multi-function relay output terminals, up to 44 types. For details, see F08.02 and F08.03 output terminal function introduction.	TA1-TB1 and TA2-TB2 are normally closed; TA1-TC1 and TA2-TC2 are normally open. Contact capacity: 250VAC/2A (COSΦ=1); 250VAC/1A (COSΦ=0.4), 30VDC/1A.
	TB1		
	TC1		
	TA2		
	TB2		
	TC2		
Digital Output	Y1	Open collector output terminals can be up to 44 types. For details, see F08.04 and F08.05 output terminal function introduction.	Output voltage range: 0V ~ 24V Output current range: 0mA ~ 50mA
	Y2		
	DO	Programmable pulse signal output terminal with multiple functions, up to 16 types. For details, see F08.06 output terminal function introduction. (Common terminal: COM).	OUTPUT, the output frequency range is set by F08.09 and the maximum frequency can reach 100KHz.
Power interface	+24V	+24V is the common power supply for the digital signal input terminal circuit	Maximum output current 200mA
	+10V	+10V is the common power supply for the analog input and output terminals.	Maximum output current 20mA
	COM	Digital signal and +24V power supply reference ground	Internally isolated from GND
	GND	Analog signal and +10V power supply reference ground	Internal isolation from COM
Communication interface	485+	RS485 signal + terminal	Standard RS485 communication interface, not isolated from GND, please use twisted pair or shielded wire.
	485-	RS485 signal-end	

4.2.3 Toggle switches and corresponding relationships

1.H900-S 0.75kW-22 kW



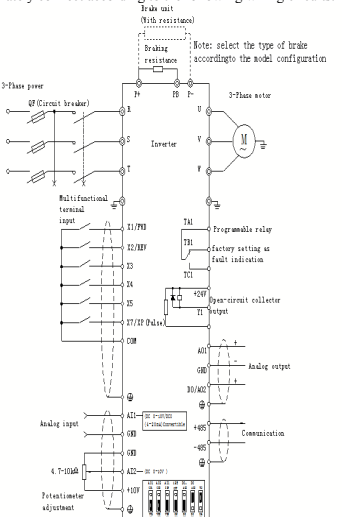
4.2.4 Main control board jumper settings

JP4	
Co1 block	Indicates Ao1 output current signal
Vo1 file	Indicates Ao1 output voltage signal
JP5	
C o2 gear	Indicates Ao2 output current signal
Vo 2nd gear	Indicates Ao2 output voltage signal
JP2	
OFF	Indicates that the matching resistor on 485 communication is not connected
ON gear	Indicates the matching resistor connection on 485 communication
JP3	
Cin block	Indicates AI1 input current signal
Vin Block	Indicates AI1 input voltage signal

H900-S 0.75kW-22kW toggle switch and corresponding relationship

4.3 Basic wiring diagram

The inverter wiring part is divided into the main circuit and the control circuit. The user can open the cover of the shell, then you can see the main circuit terminals and control circuit terminals. The user must accurately connect according to the following wiring circuits.



0.75kW-22kW

4.4 Wiring precautions

4.4.1 Main circuit wiring

- When wiring, please select the wire diameter specifications in accordance with the provisions of electrical regulations to ensure safety.
- It is best to use isolated wires or wire tubes for power wiring, and ground both ends of the isolation layer or wire tube;
- Be sure to install an air circuit breaker NPB between the power supply and the input terminals (R , S , T) . (If you use a leakage circuit breaker, please use a circuit breaker with high frequency countermeasures) .
- Please lay out the power line and control line separately and do not place them in the same wire duct.
- Do not connect AC power to the inverter output terminals (U , V , W) ;
- The output wiring must not touch the metal part of the inverter casing, otherwise it may cause a ground short circuit.
- Phase-shifting capacitors, LC and RC noise filters and other components cannot be used at the output end of the inverter.
- The inverter main circuit wiring must be kept away from other control devices.
- When the wiring between the inverter and the motor exceeds 50 meters (220V series) or (100 meters for 380V) , a very high dv/dt will be generated inside the motor coil , which will damage the interlayer insulation of the motor. Please use an AC motor dedicated to the inverter or install a reactor on the inverter side.
- When the distance between the inverter and the motor is long, please reduce the carrier frequency, because the larger the carrier, the greater the high-order harmonic leakage current on the cable, and the leakage current will have an adverse effect on the inverter and other equipment.

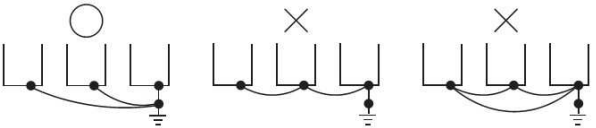
4.4.2 Control circuit wiring (signal line)

The signal line should not be placed in the same wire duct as the main circuit wiring, otherwise interference may occur. Please use shielded wire for the signal line and ground it at one end. The wire diameter should be 0.5-2mm² . It is recommended to use shielded wire for the control line. Use the control terminals on the control panel correctly as needed.

4.4.3 Grounding wire

Please use the third type of grounding (less than 100Ω) for grounding terminal E. Please use the grounding wire in accordance with the basic length and size of the electrical equipment. Absolutely avoid sharing the grounding electrode with large power equipment such as welding machines and power machinery. The grounding wire should be kept as far away from the power line of large power equipment as possible. For the grounding wiring method of multiple inverters, please use the method shown in the following figure (a) to avoid loops (b) or (c) .

- The grounding wire should be as short as possible.
- Please ground the grounding terminal E correctly and never connect it to the neutral line.

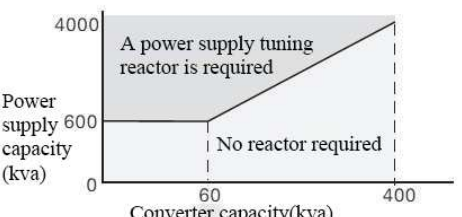


4.5 Specific application considerations

4.5.1 Model selection

(1) Installation of reactor

When the inverter is connected to a large-capacity power transformer (600kVA or more) or the phase-advancing capacitor is switched, the power input circuit will generate excessive peak current, which may damage the components of the converter part. To prevent this from happening, please install a DC reactor or AC reactor. This also helps to improve the power factor on the power supply side. In addition, when a thyristor converter such as a DC drive is connected to the same power supply system, a DC reactor or AC reactor must be installed regardless of the power supply conditions .



Reactor installation conditions

(2) Inverter capacity

When operating special motors, please confirm that the motor rated current is not higher than the inverter rated output current. In addition, when multiple induction motors are connected in parallel with one inverter, the inverter capacity should be selected so that 1.1 times the total motor rated current is less than the inverter rated output current.

(3) Starting torque

The starting and acceleration characteristics of the motor driven by the inverter are limited by the overload rated current of the combined inverter. Compared with the starting of the general commercial power supply, the torque characteristics are smaller. If a larger starting torque is required, please increase the capacity of the inverter by one level or increase the capacity of the motor and inverter at the same time.

(4) Emergency stop

Although the protection function will be activated and the output will stop when the inverter fails, the motor cannot be stopped suddenly at this time. Therefore, please set a mechanical stop and holding structure on the mechanical equipment that requires emergency stop.

(5) Special options

Terminals PB(+) and P1(+) are for connecting dedicated options. Do not connect any equipment other than dedicated options.

(6) Notes on reciprocating loads

When the inverter is used for reciprocating loads (cranes, elevators, presses, washing machines, etc.), if a current of 150% or more is repeatedly passed through it, the IGBT inside the inverter will suffer from thermal fatigue and its service life will be shortened. As a rough guideline, when the carrier frequency is 4kHz and the peak current is 150% , the number of starts / stops is approximately 8 million times.

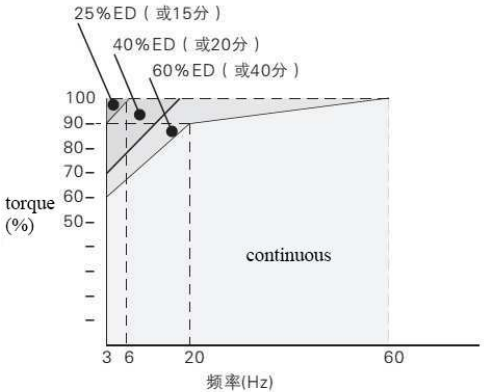
In particular, when low noise is not required, please reduce the carrier frequency. In addition, please reduce the peak current during reciprocation to less than 150% by reducing the load, extending the acceleration and deceleration time, or increasing the inverter capacity by one level . (When conducting trial runs for these purposes, be sure to confirm the peak current during reciprocation and adjust it as needed.) In addition, when used for cranes, since the start / stop action during micro-motion is faster, it is recommended to make the following selections to ensure motor torque and reduce inverter current. The capacity of the inverter should be able to ensure that its peak current is less than 150% . The capacity of the inverter should be at least one level larger than the motor capacity .

4.5.2 Precautions for using the motor

(1) For existing standard motors

Low speed range

Compared with commercial power supply, the loss of standard motors driven by inverters will increase slightly. The cooling effect will be poor in the low speed range, and the temperature of the motor will rise. Therefore, please reduce the load torque of the motor in the low speed range. The allowable load characteristics of our standard motors are shown in the figure. In addition, if 100% continuous torque is required in the low speed range, please consider whether to use a motor dedicated to inverters.



Allowable load characteristics of our standard motor

(2) Notes on use with special motors

The rated current of a pole-changing motor is different from that of a standard motor. Please confirm the maximum current of the motor and select the corresponding inverter. Please be sure to switch the number of poles after the motor stops. If the switch is performed during rotation, the regenerative overvoltage or overcurrent protection circuit will be activated and the motor will stop running freely.

Motor with brake

When using an inverter to drive a motor with a brake, if the brake circuit is directly connected to the output side of the inverter, the brake will not open due to low voltage at startup. Please use a motor with a brake whose brake power supply is independent, and connect the brake power supply to the power supply side of the inverter. In general, when using a motor with a brake, the noise may become louder in the low speed range.

(3) Power transmission structure (reducer, belt, chain, etc.)

When using oil-lubricated gearboxes, speed changers, and reducers in the power transmission system, please note that if they are operated continuously only in the low-speed range, the oil lubrication effect will be poor. In addition, high-speed operation above 60Hz will cause problems with the noise, life, and strength of the power transmission structure caused by centrifugal force, so please pay full attention to this.

Chapter 5 Operation and display

5.1 Operation panel description

5.1.1 Operation panel diagram

5.1.2 Button Description

Key Symbols	name	Functional Description
PRG	Programming Keys	Menu entry or exit, parameter modification
ENTER	Confirm key	Enter the menu and confirm parameter settings
▲	Increment key	Increment of data or function code
▼	Decrement key	Decrement of data or function code
▶▶	Shift key	Select parameter modification position and display content
RUN	Run Key	Running operations in keyboard operation mode
STOP/RESET	Stop/Reset button	Stop/Reset Operation
FUNC	Multi-function shortcut keys	Switch selection according to function

5.1.3 Function indicator light description

Indicator light name	illustrate
REV	The inverter reverse indicator light, when it is on, it indicates the reverse running state.
FWD	The inverter forward indicator light, when it is on, it indicates the forward running state.
ALM	If the indicator light is always on, it means it is in torque control state; if the indicator light flashes quickly, it means it is in fault state; if the indicator light flashes slowly, it means it is in tuning state.
Hz	Frequency Unit
A	Current Unit
V	Voltage Unit

5.1.4 Function indicator light combination description:

Indicator light combination	LED display meaning	symbol
Hz + A	Motor speed	r/min
A + V	Time (seconds)	s
Hz + V	Percentage actual value	%
Hz + A + V	temperature	℃

5.2 Operation process

5.2.1 Parameter settings

The three levels of menus are:
1. Function code group number (first level menu);
2. Function code number (secondary menu);
3. Function code setting value (three-level menu).

Note: When operating in the third-level menu, you can press PRG or ENTER to return to the second-level menu. The difference between the two is: pressing ENTER will store the set parameters in the control panel, then return to the second-level menu and automatically transfer to the next function code; pressing PRG will directly return to the second-level menu without storing parameters and remain at the current function code.

In the third-level menu state, if the parameter has no flashing bit, it means that the function code cannot be modified. Possible reasons are:

1) This function code is a parameter that cannot be modified, such as actual detection parameters, operation record parameters, etc.
2) This function code cannot be modified in the running state and can only be modified after stopping the machine.

5.2.2 Fault Reset

After the inverter fails, the inverter will prompt the relevant fault information. The user can reset the fault by pressing the STOP/RESET key on the keyboard or the terminal function. After the inverter fault is reset, it is in standby state. If the inverter is in a fault state and the user does not reset it, the inverter is in a running protection state and cannot run.

5.2.3 Motor parameter self-learning

Select vector control mode . Before the inverter is running, the nameplate parameters of the motor must be accurately entered. This nameplate parameter matches the standard motor parameter; the vector control method is highly dependent on the motor parameters. To obtain good control performance, The accurate parameters of the controlled motor must be obtained.

Chapter 6 Function parameter table

If F15.00 is set to a non-zero value, the parameter protection password is set. In the function parameter mode and the user parameter change mode, the parameter menu can only be entered after the password is correctly entered. To cancel the password, F15.00 must be set to 0. The parameter menu in the user customized parameter mode is not protected by a password.

The symbols in the function table are explained as follows:

“☆”: Indicates that the setting value of this parameter can be changed when the inverter is in the stop or running state;

“★”: Indicates that the setting value of this parameter cannot be changed when the inverter is in operation;

“●”: Indicates that the value of the parameter is the actual test record value and cannot be changed;

“*”: Indicates that the parameter is a “factory parameter”, which is limited to the manufacturer’s setting and is prohibited for users to operate.

F00 Basic function group				
Function code	name	Setting range	Factory value	Change
F00.00	Function macro definition	0: General mode 1: One variable frequency pump and two industrial frequency pumps (1 variable frequency pump + 2 industrial frequency pumps) water supply mode 1 2: Three-pump circulation soft start (3 variable frequency pumps) water supply mode 3: One variable frequency pump + three industrial frequency pumps (1 variable frequency pump + 3 industrial frequency pumps) water supply mode 4: One variable frequency pump and two industrial frequency pumps (1 variable frequency pump + 2 industrial frequency pumps) water supply mode 2 5: One variable frequency pump and one industrial frequency pump (1 variable frequency pump + 1 industrial frequency pump) water supply mode 6: Single pump water supply (1 variable frequency pump) mode 7: Photovoltaic water supply voltage tracking mode	0	★

		8: Photovoltaic water supply power tracking VF mode 9: Photovoltaic water supply power tracking SVC mode 10-100: Reserved Note: Initialize the parameters first, then set the macro function.		
F00.01	Motor control method	0: V/F control 1: Speed sensorless vector control (SVC)	0	★
F00.02	Command source selection	0: Operation panel command channel 1: Terminal command channel 2: Communication command channel	0	☆
F00.03	Main frequency source A selection	0: Digital setting (preset frequency F00.08, UP/DOWN can be modified, power off will not be remembered) 1: Digital setting (preset frequency F00.08, UP/DOWN can be modified, power-off memory) 2: AI1 (0~10V/20mA) 3: AI2 (0~10V) 4: Panel potentiometer 5: PULSE setting (X7) 6: Multi-segment instructions 7: Simple PLC 8: PID 9: Communication setting 10: Multi-pump instruction (the water pump sleep frequency is determined by F16.27) 11: MPPT setting (photovoltaic water supply) 12: Reserved 13: Customized multi-speed mode setting (pile machine)	4	★
F00.04	Auxiliary frequency source B selection	Same as F00.03 (main frequency source A selection)	0	★
F00.05	Auxiliary frequency source B range	0: relative to the maximum frequency	0	☆

	selection when superimposing	1: relative to frequency source A		
F00.06	Auxiliary frequency source B range when superimposed	0% ～ 150%	100%	☆
F00.07	Frequency source B superposition selection	Units: Frequency source selection 0: Main frequency source A 1: Primary and secondary operation results (the operation relationship is determined by the tens digit) 2: Switch between main frequency source A and auxiliary frequency source B 3: Switch between main frequency source A and main and auxiliary operation results 4: Switch between auxiliary frequency source B and main and auxiliary operation results Tens digit: Frequency source main and auxiliary operation relationship 0: Main + Auxiliary 1: Primary - Secondary 2: The maximum value of the two 3: The minimum of the two	00	☆
F00.08	Preset frequency	0.00Hz～maximum frequency (F00.10)	50.00Hz	☆
F00.09	Running direction	0: The direction is consistent 1: Opposite direction	0	☆
F00.10	Maximum frequency	50.00Hz ～ 50 0.00Hz	50.00Hz	★
F00.11	Upper frequency source	0: F00.12 setting 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE setting 5: Communication setting	0	★
F00.12	Upper frequency	Lower limit frequency F00.14 ~ maximum frequency F00.10	50.00Hz	☆
F00.13	Upper frequency offset	0.00Hz ~ Maximum frequency F00.10	0.00Hz	☆
F00.14	Lower frequency	0.00Hz ~ upper limit frequency F00.12	0.00Hz	☆

F00.15	Carrier frequency	0.5kHz ～ 16.0kHz	Model confirmation	☆
F00.16	Carrier frequency adjusts with temperature	0: No 1: Yes	1	☆
F00.17	Acceleration time 1	0.00s ～ 650.00s (F00.19=2) 0.0s ～ 6500.0s (F00.19=1) 0s ～ 65000s (F00.19=0)	Model confirmation	☆
F00.18	Deceleration time 1	0.00s ～ 650.00s (F00.19=2) 0.0s ～ 6500.0s (F00.19=1) 0s ～ 65000s (F00.19=0)	Model confirmation	☆
F00.19	Acceleration and deceleration time unit	0: 1 second 1: 0.1 sec 2: 0.01 sec	1	★
F00.21	Auxiliary frequency source offset frequency when superimposed	0.00Hz ~ Maximum frequency F00.10	0.00Hz	☆
F00.22	Frequency command resolution	1: 0.1Hz 2: 0.01Hz	2	★
F00.23	Digital setting frequency stop memory selection	0: No memory 1: Memory	0	☆
F00.24	reserve	—	0	★
F00.25	Acceleration/deceleration time reference frequency	0: Maximum frequency (F00.10) 1: Set frequency 2: 100Hz	0	★
F00.26	Frequency command UP/DOWN reference during operation	0: operating frequency 1: Set frequency	0	★
F00.27	Command source bundled with frequency source	Units: Operation panel command binding frequency source selection 0: No binding 1: Digital setting frequency 2: AI1 3: AI2 4: Panel potentiometer 5: PULSE pulse setting (X7) 6: Multi-speed 7: Simple PLC	00000	☆

		8: PID 9: Communication setting Tens digit: Terminal command binding frequency source selection Hundreds place: Communication command binding frequency source selection Thousands: Automatically run binding frequency source selection		
F00.28	Serial communication protocol selection	0: Modbus protocol 1: Keep	0	☆
F00.29	GP type display	1: G type (constant torque load type) 2: P type (fan, water pump load type)	Model confirmation	●
F01 Group start and stop control				
Function code	name	Setting range	Factory value	Change
F01.00	Startup method	0: Direct start 1: Speed tracking restart 2: Pre-excitation start (AC asynchronous motor) 3: Super fast start (valid in vector mode)	0	☆
F01.01	Speed tracking mode	0: Start from the stop frequency 1: Start from zero speed 2: Start from the maximum frequency	0	★
F01.02	Speed tracking speed	1 ～ 100	20	☆
F01.03	Start frequency	0.00Hz ～ 10.00Hz	0.00Hz	☆
F01.04	Start frequency holding time	0.0s ～ 100.0s	0.0s	★
F01.05	Starting DC braking current/ pre-excitation current	0% ～ 100%	50%	★
F01.06	Starting DC braking time/ pre-excitation time	0.0s ～ 100.0s	0.0s	★
F01.07	Acceleration and deceleration method	0: Linear acceleration and deceleration 1: S curve acceleration/deceleration A 2: S curve acceleration and deceleration B	0	★
F01.08	S curve start time ratio	0.0% ～ (100.0%-F01.09)	30.0%	★
F01.09	S curve end period time ratio	0.0% ～ (100.0%-F01.08)	30.0%	★

F01.10	Shutdown mode	0: decelerate and stop 1: Free parking	0	☆
F01.11	DC braking start frequency at shutdown	0.00Hz ~ Maximum frequency	0.00Hz	☆
F01.12	DC braking waiting time	0.0s ~ 100.0s	0.0s	☆
F01.13	DC braking current at shutdown	0% ~ 100%	5 0%	☆
F01.14	DC braking time at shutdown	0.0s ~ 100.0s	0.0s	☆
F01.15	Braking rate	0% ~ 100%	100%	☆
F01.16~ F01.20	reserve	—	0	☆
F01.21	Speed tracking delay	0.00 ~ 5.00s	0.50s	☆
F01.2 2	Zero frequency braking voltage	0.0 ~ 30.0% (rated voltage of motor)	0.0%	☆
F02 Group Auxiliary Functions				
Function code	name	Setting range	Factory value	Change
F02.00	Jog operation frequency	0.00Hz ~ Maximum frequency	2.00Hz	☆
F02.01	Jog acceleration time	0.0s ~ 6500.0s	20.0s	☆
F02.02	Jog deceleration time	0.0s ~ 6500.0s	20.0s	☆
F02.03	Acceleration time 2	0.0s ~ 6500.0s	Model confirmation	☆
F02.04	Deceleration time 2	0.0s ~ 6500.0s	Model confirmation	☆
F02.05	Acceleration time 3	0.0s ~ 6500.0s	Model confirmation	☆
F02.06	Deceleration time 3	0.0s ~ 6500.0s	Model confirmation	☆
F02.07	Acceleration time 4	0.0s ~ 6500.0s	Model confirmation	☆
F02.08	Deceleration time 4	0.0s ~ 6500.0s	Model confirmation	☆
F02.09	Hop frequency 1	0.00Hz ~ Maximum frequency	0.00Hz	☆
F02.10	Hop frequency 2	0.00Hz ~ Maximum frequency	0.00Hz	☆
F02.11	Jump frequency amplitude	0.00Hz ~ Maximum frequency	0.01Hz	☆
F02.12	Forward and reverse dead time	0.0s ~ 3000.0s	0.0s	☆
F02.13	Reverse frequency prohibition	0: Invalid 1: Valid	0	☆
F02.14	The set frequency is lower than the lower limit frequency Operation Mode	0: Run at the lower frequency limit 1: Shutdown 2: Zero speed operation	0	☆

F02.15	Droop control	0.00Hz ～ 10.00Hz	0.00Hz	☆
F02.16	Set the cumulative power-on arrival time	0h ~ 65000h Note: Invalid when F02.16=0	0h	☆
F02.17	Set the cumulative running arrival time	0h ~ 65000h Note: Invalid when F02.17=0	0h	☆
F02.18	Start protection selection	0: No protection 1: Protection Note: When F02.18=0, the terminal power-on detection run command is valid; when F02.18=1, the terminal power-on detection run command is invalid.	0	☆
F02.19	Frequency detection value (FDT1)	0.00Hz ~ Maximum frequency	50.00Hz	☆
F02.20	Frequency detection hysteresis value (FDT1)	0.0% to 100.0% (FDT1 level)	5.0%	☆
F02.21	Frequency arrival (FAR) detection width	0.0% ~ 100.0% (maximum frequency)	0.0%	☆
F02.22	Is the jump frequency valid during acceleration and deceleration?	0: Invalid 1: Valid	0	☆
F02.23	Switching frequency point between acceleration time 1 and acceleration time 2	0.00Hz ~ Maximum frequency	0.00Hz	☆
F02.24	Switching frequency point between deceleration time 1 and deceleration time 2	0.00Hz ~ Maximum frequency	0.00Hz	☆
F02.25	Terminal jog priority	0: Invalid 1: Valid	0	☆
F02.26	Frequency detection value (FDT2)	0.00Hz ~ Maximum frequency	50.00Hz	☆
F02.27	Frequency detection hysteresis value (FDT2)	0.0% ~ 100.0% (FDT2 level)	5.0%	☆
F02.28	Arbitrary frequency detection value 1	0.00Hz ~ Maximum frequency	50.00Hz	☆
F02.29	Any frequency detection width 1	0.0% ~ 100.0% (maximum frequency)	0.0%	☆
F02.30	Arbitrary frequency detection value 2	0.00Hz ~ Maximum frequency	50.00Hz	☆
F02.31	Frequency detection width 2	0.0% ~ 100.0% (maximum frequency)	0	☆

F02.32	Zero current detection level	0.0% ～ 300.0% 100.0% corresponds to the rated current of the motor	5.0%	☆
F02.33	Zero current detection delay time	0.01s ～ 600.00s	0.10s	☆
F02.34	Output current exceeds limit	0.0% (not detected) 0.1% ~ 300.0% (rated motor current)	200.0%	☆
F02.35	Output current over-limit detection delay time	0.00s ～ 600.00s	0.00s	☆
F02.36	Arbitrary current 1	0.0% ~ 300.0% (motor rated current)	100.0%	☆
F02.37	Arbitrary current 1 width	0.0% ~ 300.0% (motor rated current)	0.0%	☆
F02.38	Arbitrary current 2	0.0% ~ 300.0% (motor rated current)	100.0%	☆
F02.39	Arbitrary current 2 width	0.0% ~ 300.0% (motor rated current)	0.0%	☆
F02.40	Timing function selection	0: Invalid 1: Valid	0	☆
F02.41	Scheduled running time selection	0: F02.42 setting 1: AI1 2: AI2 3: Panel potentiometer Note: The analog input range corresponds to F02.42	0	☆
F02.42	Scheduled running time	0.0Min ～ 6500.0Min	0.0Min	☆
F02.43	AI1 input voltage protection value lower limit	0.00V ～ F02.44	3.10V	☆
F02.44	AI1 input voltage protection value upper limit	F02.43 ～ 1 1.00V	6.80V	☆
F02.45	Module temperature reaches	0℃～ 100℃	75℃	☆
F02.46	Cooling fan control	0: Fan runs during operation 1: The fan is always running	0	☆
F02.47	Wake-up frequency	Sleep frequency (F02.49) ~ maximum frequency (F00.10)	0.00Hz	☆
F02.48	Wake-up delay time	0.0s ～ 6500.0s	0.0s	☆
F02.49	Sleep frequency	0.00Hz ~ wake-up frequency (F02.47)	0.00Hz	☆
F02.50	Sleep delay time	0.0s ～ 6500.0s	0.0s	☆

F02.51	Arrival time setting for this run	0.0 to 6500.0 minutes	0.0Min	☆
F02.52	Output power correction factor	0.00% ～ 200.0%	100.0%	☆
F03 Group Motor Parameters				
Function code	name	Setting range	Factory value	Change
F03.00	Motor Type Selection	0: Ordinary asynchronous motor 1: Variable frequency asynchronous motor	0	★
F03.01	Motor rated power	0.1kW ～ 1000.0kW	Model confirmation	★
F03.02	Motor rated voltage	1V ～ 2000V	Model confirmation	★
F03.03	Motor rated current	0.01A ~ 655.35A (inverter power <= 55kW) 0.1A ~ 6553.5A (Inverter power>55kW)	Model confirmation	★
F03.04	Motor rated frequency	0.01Hz ~ Maximum frequency	Model confirmation	★
F03.05	Motor rated speed	1rpm ～ 65535rpm	Model confirmation	★
F03.06	Stator resistance of asynchronous motor	0.001Ω ~ 65.535Ω (Inverter power <= 55kW) 0.0001Ω ~ 6.5535Ω (inverter power>55kW)	Tuning parameters	★
F03.07	Asynchronous motor rotor resistance	0.001Ω ~ 65.535Ω (Inverter power <= 55kW) 0.0001Ω ~ 6.5535Ω (inverter power>55kW)	Tuning parameters	★
F03.08	Asynchronous motor leakage inductance	0.01mH ～ 655.35mH (Inverter power <=55kW) 0.001mH ~ 65.535mH (inverter power>55kW)	Tuning parameters	★
F03.09	Asynchronous motor mutual inductance	0.1mH ～ 6553.5mH (Inverter power <=55kW) 0.01mH ～ 655.35mH (Inverter power >55kW)	Tuning parameters	★
F03.10	Asynchronous motor no-load current	0.01A ~ F03.03 (inverter power <= 55kW) 0.1A ~ F03.03 (inverter power>55kW)	Tuning parameters	★
F03.11 ~ F03.36	reserve	—	0	★
F03.27	Tuning selection	0: No operation 1: Asynchronous motor static tuning 2: Complete tuning of asynchronous motor 3: Static complete parameter identification	0	★

F04 Motor vector control parameters				
Function code	name	Setting range	Factory value	Change
F04.00	Speed loop proportional gain 1	1 ～ 100	30	☆
F04.01	Speed loop integral time 1	0.01s ～ 10.00s	0.50s	☆
F04.02	Switching frequency 1	0.00 ～ F04.05	5.00Hz	☆
F04.03	Speed loop proportional gain 2	1 ～ 100	20	☆
F04.04	Speed loop integral time 2	0.01s ～ 10.00s	1.00s	☆
F04.05	Switching frequency 2	F04.02 ~ Maximum frequency	10.00Hz	☆
F04.06	Vector control slip gain	50% ～ 200%	100%	☆
F04.07	Speed loop filter time constant	0.000s ～ 0.100s	0.015s	☆
F04.08	Vector control overexcitation gain	0 ～ 200	64	☆
F04.09	Torque upper limit source in speed control mode	0: Function code F04.10 setting 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE setting 5: Communication setting 6: MIN(AI1,AI2) 7: MAX(AI1,AI2) The full scale of options 1-7 corresponds to F04.10	0	☆
F04.10	Digital setting of torque upper limit in speed control mode	0.0% ～ 200.0%	1 6 0.0%	☆
F04.13	Excitation regulation proportional gain	0 ～ 60000	2000	☆
F04.14	Excitation regulation integral gain	0 ～ 60000	1300	☆
F04.15	Torque regulation proportional gain	0 ～ 60000	2000	☆
F04.16	Torque regulation integral gain	0 ～ 60000	1300	☆
F04.17	Speed loop integral separation	0: Invalid 1: Valid	0	☆
F04.18 ~F04.20	reserve	—	0	☆

F05 group torque control parameters				
Function code	name	Setting range	Factory value	Change
F05.00	Speed/torque control mode selection	0: Speed control 1: Torque control	0	★
F05.01	Torque setting source selection in torque control mode	0: Digital setting 1 (F05.03) 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE 5: Communication setting 6: MIN(AI1,AI2) 7: MAX(AI1,AI2) (Full scale of options 1-7 corresponds to the digital setting of F05.03)	0	★
F05.03	Digital setting of torque in torque control mode	—200.0% ～ 200.0%	150.0%	☆
F05.05	Torque control forward maximum frequency	0.00Hz ~ Maximum frequency	50.00Hz	☆
F05.06	Torque control reverse maximum frequency	0.00Hz ~ Maximum frequency	50.00Hz	☆
F05.07	Torque control acceleration time	0.00s ～ 650.00s	0.00s	☆
F05.08	Torque control deceleration time	0.00s ～ 650.00s	0.00s	☆
F06 Group V/F Control Parameters				
Function code	name	Setting range	Factory value	Change
F06.00	VF curve setting	0: Linear V/F 1: Multi-point V/F 2: Square V/F 3: 1.2 V/F 4: 1.4 V/F 5: Keep 6: 1.6 V/F 7: Reserve	0	★

		8: 1.8 V/F 9: Reserve 10: VF complete separation mode 11: VF semi-separation mode		
F06.01	Torque boost	0.0%: (Automatic torque boost) 0.1% ～ 30.0%	Model confirmation	☆
F06.02	Torque boost cut-off frequency	0.00Hz ~ Maximum frequency	50.00Hz	★
F06.03	Multi-point VF frequency point F1	0.00Hz ～ F06.05	0.00Hz	★
F06.04	Multi-point VF voltage point V1	0.0% ～ 100.0%	0.0%	★
F06.05	Multi-point VF frequency point F2	F06.03 to F06.07	0.00Hz	★
F06.06	Multi-point VF voltage point V2	0.0% ～ 100.0%	0.0%	★
F06.07	Multi-point VF frequency point F3	F06.05 ~ Motor rated frequency (F03.04)	0.00Hz	★
F06.08	Multi-point VF voltage point V3	0.0% ～ 100.0%	0.0%	★
F06.09	VF slip compensation gain	0.0% ～ 200.0%	0.0%	☆
F06.10	VF overexcitation gain	0 ～ 200	64	☆
F06.11	VF oscillation suppression gain	0 ～ 100	Model confirmation	☆
F06.13	VF separated voltage source	0: Digital setting (F06.14) 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE pulse setting (X7) 5: Multiple instructions 6: Simple PLC 7: PID 8: Communication setting Note: 100.0% corresponds to the rated voltage of the motor	0	☆
F06.14	Digital setting of voltage for VF separation	0V ~ Motor rated voltage	0V	☆
F06.15	Voltage acceleration time for VF separation	0.0s ～ 1000.0s Note: It indicates the time from 0V to the rated voltage of the motor.	0.0s	☆
F06.16	Voltage deceleration time for VF	0.0s ～ 1000.0s	0.0s	☆

	separation	Note: It indicates the time from 0V to the rated voltage of the motor.		
F06.17	VF separation shutdown mode selection	0: Frequency/voltage are reduced to 0 independently 1: After the voltage is reduced to 0, the frequency is further reduced	0	☆
F06.18	VF over-current stall action current	50～ 200%	150%	☆
F06.19	VF overcurrent stall enable	0: Invalid 1: Valid	1	☆
F06.20	VF overcurrent stall suppression gain	0～100	20	
F06.21	VF speed overload stall action Current compensation coefficient	50～ 200%	50%	☆
F06.22	VF overvoltage stall action voltage	200.0～ 2000.0	760.0	☆
F06.23	VF overvoltage stall enable	0: Invalid 1: Valid	1	☆
F06.24	VF overvoltage stall suppression frequency gain	0～100	30	☆
F06.25	VF overvoltage stall suppression voltage gain	0～100	30	☆
F06.26	Overvoltage stall maximum rising limit frequency	0～ 50Hz	5 Hz	☆
F07 group input terminals				
Function code	name	Setting range	Factory value	Change
F07.00	X1 terminal function selection	0: No function 1: Forward running FWD or running command 2: Reverse running REV or forward and reverse running direction (Note: When set to 1 or 2, it must be used in conjunction with F07.11. For details, see the function code parameter description.) 3: Three-wire operation control 4: Forward jog (FJOG)	1	★
F07.01	X2 terminal function selection		2	★
F07.02	X3 terminal function selection		9	★
F07.03	X4 terminal function selection		12	★
F07.04	X5 terminal function selection		13	★
F07.05	X6 terminal function selection		0	★
F07.06	X7 terminal function selection		30	★
F07.07	reserve		0	★
F07.08	reserve		0	★

F07.09	reserve	5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Free parking 9: Fault reset (RESET) 10: Operation paused 11: External fault normally open input 12: Multi-segment command terminal 1 13: Multi-segment command terminal 2 14: Multi-segment command terminal 3 15: Multi-segment command terminal 4 16: Acceleration/deceleration time selection terminal 1 17: Acceleration/deceleration time selection terminal 2 18: Frequency source switching 19: UP/DOWN setting clear (terminal, keyboard) 20: Control command switching terminal 1 21: Acceleration and deceleration prohibited 22: PID pause 23: PLC status reset 24: Swing frequency pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control disabled 30: PULSE frequency input (valid only for X7) 31: Reserved 32: Immediate DC braking 33: External fault normally closed input 34: Frequency modification enable 35: PID action direction is reversed 36: External parking terminal 1 37: Control command switching terminal 2	0	★

		38: PID integration pause 39: Frequency source A and preset frequency switching 40: Frequency source B and preset frequency switch 41: Reserved 42: Reserved 43: PID parameter switching 44: User-defined fault 1 45: User-defined fault 2 46: Speed control/torque control switch 47: Emergency Stop 48: External parking terminal 2 49: Deceleration DC braking 50: This running time is reset 51: Two-wire/three-wire switching 52: Reverse is prohibited 53: Start/Stop 54: Run allowed 55: Interlock 1 56: Interlock 2 57: Interlock 3 58: PFC start/stop 59-63 : Reserved 64: Customized multi-segment mode 0 65: Customized multi-segment mode 1 66: Customized multi-segment mode 2 67: Customized multi-segment mode 3 68: Customized multi-segment mode 4 69: Customized multi-segment mode 5 70: Customized multi-segment mode 6 71: Customized multi-segment mode 7		
F07.10	X filter time	0.000s ～ 1.000s	0.010s	☆
F07.11	Terminal command mode	0: Two-wire 1 1: Two-wire 2	0	★

		2: Three-wire 1 3: Three-wire 2		
F07.12	Terminal UP/DOWN change rate	0.001Hz/s ～ 65.535Hz/s	1.00Hz/s	☆
F07.13	AI curve 1 minimum input	0.00V ～ F07.15	0.00V	☆
F07.14	AI curve 1 minimum input corresponding setting	-100.0% ～ +100.0%	0.0%	☆
F07.15	AI curve 1 maximum input	F07.13 ～ +10.00V	10.00V	☆
F07.16	AI curve 1 maximum input corresponding setting	—100.0% ～ + 150.0 %	100.0%	☆
F07.17	AI1 filter time	0.00s ～ 10.00s	0.10s	☆
F07.18	AI curve 2 minimum input	0.00V ～ F07.20	0.00V	☆
F07.19	AI curve 2 minimum input corresponding setting	—100.0% ～ +1 0 0.0%	0.0%	☆
F07.20	AI curve 2 maximum input	F07.18 ～ +10.00V	10.00V	☆
F07.21	AI curve 2 maximum input corresponding setting	—100.0% ～ + 150.0 %	100.0%	☆
F07.22	AI2 filter time	0.00s ～ 10.00s	0.10s	☆
F07.23	Panel potentiometer minimum input	—10.00V ～ F07.25	-9.50V	☆
F07.24	Panel potentiometer minimum input corresponding setting	-100.0% ～ +100.0%	0.0%	☆
F07.25	Panel potentiometer maximum input	F07.23 ～ +10.00V	9.50V	☆
F07.26	Panel potentiometer maximum input corresponding setting	—100.0% ～ + 150.0 %	100.0%	☆
F07.27	Panel potentiometer filter time	0.00s ～ 10.00s	0.10s	☆
F07.28	PULSE minimum input	0.00kHz～F07.30	0.00kHz	☆
F07.29	PULSE minimum input corresponding setting	—100.0% ～ 100.0%	0.0%	☆
F07.30	PULSE maximum input	F07.28 ～ 100.00kHz	50.00kHz	☆
F07.31	PULSE maximum input setting	—100.0% ～ 100.0%	100.0%	☆
F07.32	PULSE filter time	0.00s ～ 10.00s	0.10s	☆
F07.33	AI curve selection	Units: AI1 curve selection 1: Curve 1 (2 points, see F07.13 ~ F07.16) 2: Curve 2 (2 points, see F07.18 ~ F07.21)	321	☆

		3: Keep 4: Curve 4 (4 points, see F18.00 ~ F18.07) 5: Curve 5 (4 points, see F18.08 ~ F18.15) Tens digit: AI2 curve selection, same as above Hundreds place: Reserved		
F07.34	AI below minimum input setting selection	Units: AI1 is below the minimum input setting selection 0: corresponds to the minimum input setting 1:0.0% Tens place: AI2 is lower than the minimum input setting selection, same as above Hundreds place: Panel potentiometer is lower than the minimum input setting selection, same as above	000	☆
F07.35	X1 Delay Time	0.0s ～ 3600.0s	0.0s	★
F07.36	X2 Delay Time	0.0s ～ 3600.0s	0.0s	★
F07.37	X3 Delay Time	0.0s ～ 3600.0s	0.0s	★
F07.38	X terminal effective mode selection 1	0: High level is valid 1: Low level is valid Units: X1 Tens: X2 Hundreds digit: X3 Thousands: X4 Ten thousand digit: X5	00000	★
F07.39	X terminal effective mode selection 2	0: High level is valid 1: Low level is valid Units: X6 Tens: X7 Hundreds place: Reserved Thousands: Reserved Ten thousand digit: reserved	00000	★
F07.40	AI2 input signal selection	0: Voltage signal 1: Current signal	0	★
F08 group output terminal				

Function code	name	Setting range	Factory value	Change
F08.00	DO/AO2 terminal output mode selection	0: Pulse output (DOP) 1: Switching output (DOR) 2: Analog output (AO2) Note: DOP and DOR are both output through the main control board terminal DO, and DO and AO2 can be selected through the main control board jumper.	2	☆
F08.01	DOR output function selection	0: No output 1: The inverter is running 2: Fault output (fault causing free stop) 3: Frequency level detection FDT1 output 4: Frequency Arrival Signal (FAR) 5: Zero speed operation (no output when stopped) 6: Motor overload warning 7: Inverter overload warning 8: Set count value reached 9: The specified count value has been reached 10: Length reached 11: PLC cycle completed 12: Accumulated running time reached 13: Frequency limited 14: Torque limited 15: Ready to run 16: AI1 > AI2 17: Upper frequency limit reached 18: Lower frequency limit reached (operation related) 19: Undervoltage status output 20: Communication settings 21: Reserved 22: Reserved 23: Zero speed running 2 (also output when stopped)	0	☆
F08.02	Control board relay R1 function selection		2	☆
F08.03	Control board relay R2 output function selection		0	☆
F08.04	Open collector Y1 output function selection		1	☆
F08.05	Open collector Y2 output selection		0	☆

		24: Accumulated power-on time has expired 25: Frequency level detection FDT2 output 26: Frequency 1 reaches output 27: Frequency 2 reaches output 28: Current 1 reaches the output 29: Current 2 reaches the output 30: Timing arrival output 31: AI1 input exceeds limit 32: Downloading 33: Reverse running 34: Zero current state 35: Module temperature reaches 36: Output current exceeds limit 37: Lower frequency limit reached (output even when stopped) 38: Alarm output (all faults) 39: Motor over-temperature warning 40: This running time has expired 41: Fault output (free stop fault and no output due to undervoltage) 42: Interlock 1 output 43: Interlock 2 output 44: Interlock 3 output		
F08.06	DOP output function selection	0: operating frequency 1: Set frequency 2: Output current (2 times the rated current of the motor) 3: Output torque (2 times the rated torque of the motor) 4: Output power (2 times rated power) 5: Output voltage (1.2 times the rated voltage of the inverter) 6: PULSE input (100.0% corresponds to 100.0kHz) 7: AI1 8: AI2	0	☆
F08.07	AO1 output function selection		0	☆
F08.08	AO2 output function selection		1	☆

		9: Reserve 10: Length 11: Record value 12: Communication settings 13: Motor speed 14: Output current (100.0% corresponds to 1000.0A 15: Output voltage (100.0% corresponds to 1000.0V 16: Output torque (actual torque value)		
F08.09	DOP output maximum frequency	0.01KHz ～ 100.00KHz	50.00Hz	☆
F08.10	AO1 zero bias coefficient	-100.0% ～ +100.0%	0.0%	☆
F08.11	AO1 Gain	-10.00 ～ +10.00	1.00	☆
F08.12	AO2 bias coefficient	-100.0% ～ +100.0%	0.0%	☆
F08.13	AO2 Gain	-10.00 ～ +10.00	1.00	☆
F08.14 ～F08.1 6	reserve	—	0	☆
F08.1 7	DOR output delay time	0.0s ～ 3600.0s	0.0s	☆
F08.18	R1 output delay time	0.0s ～ 3600.0s	0.0s	☆
F08.19	R2 output delay time	0.0s ～ 3600.0s	0.0s	☆
F08.20	Y1 output delay time	0.0s ～ 3600.0s	0.0s	☆
F08.21	Y2 output delay time	0.0s ～ 3600.0s	0.0s	☆
F08.22	Switch output terminal effective state selection	0: Positive logic. 1: Anti-Logic Units: Reserved Tens: R1 Hundreds place: R2 Thousands: Y1 Ten thousand digit: Y2	0000	☆
F08.23	AO1 output signal selection	0: Voltage signal 1: Current signal	0	★
F09 Group PID function				
Function	name	Setting range	Factory value	Change

code				
F09.00	PID given source	0: F09.01 setting 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE pulse setting (X7) 5: Communication setting 6: Multi-segment instruction setting 7: Pressure setting (MPa, Kg)	0	☆
F09.01	PID value given	0.0% ～ 100.0%	50.0%	☆
F09.02	PID feedback source	0: AI1 1: AI2 2: Keep 3: AI1-AI2 4: PULSE pulse setting (X7) 5: Communication setting 6: AI1+AI2 7: MAX(|AI1|, |AI2|) 8: MIN(|AI1|, |AI2|)	0	☆
F09.03	PID action direction	0: Positive effect 1: Counteraction	0	☆
F09.04	PID given feedback range	0 ~ 65535	1000	☆
F09.05	Proportional gain Kp1	0.0 ～ 999.9	20.0	☆
F09.06	Integration time Ti1	0.01s ～ 10.00s	2.00s	☆
F09.07	Derivative time Td1	0.000s ～ 10.000s	0.000s	☆
F09.08	PID reverse cut-off frequency	0.00 ~ Maximum frequency	2.00Hz	☆
F09.09	PID deviation limit	0.0% ～ 100.0%	0.0%	☆
F09.10	PID differential limiting	0.00% ～ 100.00%	0.5 0 %	☆
F09.11	PID given change time	0.00 ～ 650.00s	0.00s	☆
F09.12	PID feedback filter time	0.00 ～ 60.00s	0.00s	☆
F09.13	PID output filter time	0.0 ～ 60 0.0s	10 0.0s	☆
F09.14	reserve	-	-	☆
F09.15	Proportional gain Kp2	0.0 ～ 999.9	20.0	☆

F09.16	Integration time Ti2	0.01s ～ 10.00s	2.00s	☆
F09.17	Derivative time Td2	0.000s ～ 10.000s	0.000s	☆
F09.18	PID parameter switching conditions	0: Do not switch 1: Switch via X terminal 2: Automatically switch according to deviation 3 to 8: Reserved	0	☆
F09.19	PID parameter switching deviation 1	0.0% ～ F09.20	20.0%	☆
F09.20	PID parameter switching deviation 2	F09.19 ～ 100.0%	80.0%	☆
F09.21	PID initial value	0.0% ～ 100.0%	0.0%	☆
F09.22	PID initial value holding time	0.00 ～ 650.00s	0.00s	☆
F09.23～ F09.24	reserve	—	0	☆
F09.25	PID feedback upper limit loss detection value	0.0%: No feedback loss is determined 0.1% ～ 100.0%	0.0%	☆
F09.26	PID feedback lower limit loss detection value		0.0%	☆
F09.27	PID feedback loss detection time	0.0s ～ 20.0s	0.0s	☆
F09.28	PID shutdown calculation	0: Stop and do not calculate 1: Operation during shutdown	0	☆

F10 group multi-segment instructions, simple PLC

Function code	name	Setting range	Factory value	Change
F10.00	Multi-segment instruction 0	-100.0% ～ 100.0%	0.0%	☆
f/10.01	Multi-segment instruction 1	-100.0% ～ 100.0%	0.0%	☆
f/10.02	Multi-segment instruction 2	-100.0% ～ 100.0%	0.0%	☆
f/10.03	Multi-segment instruction 3	-100.0% ～ 100.0%	0.0%	☆
f/10.04	Multi-segment instruction 4	-100.0% ～ 100.0%	0.0%	☆
f/10.05	Multi-segment instruction 5	-100.0% ～ 100.0%	0.0%	☆
f/10.06	Multi-segment instruction 6	-100.0% ～ 100.0%	0.0%	☆
f/10.07	Multi-segment instruction 7	-100.0% ～ 100.0%	0.0%	☆
f/10.08	Multi-segment instruction 8	-100.0% ～ 100.0%	0.0%	☆
f/10.09	Multi-segment instruction 9	-100.0% ～ 100.0%	0.0%	☆
f/10.10	Multi-segment instruction 10	-100.0% ～ 100.0%	0.0%	☆

f/10.11	Multi-segment instruction 11	-100.0% ～ 100.0%	0.0%	☆
f/10.12	Multi-segment instruction 12	-100.0% ～ 100.0%	0.0%	☆
f/10.13	Multi-segment instruction 13	-100.0% ～ 100.0%	0.0%	☆
f/10.14	Multi-segment instruction 14	-100.0% ～ 100.0%	0.0%	☆
f/10.15	Multi-segment instruction 15	-100.0% ～ 100.0%	0.0%	☆
f/10.16	Simple PLC operation mode	0: Stop after a single run 1: Keep the final value after a single run 2: Keep looping	0	☆
f/10.17	Simple PLC power-off memory selection	Units: Power-off memory selection 0: No memory after power failure 1: Power-off memory Tens: Stop memory selection 0: No memory when stopping 1: Shutdown memory	00	☆
f/10.18	Simple PLC 0th stage running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
f/10.19	Simple PLC 0th stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.20	Simple PLC first stage running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
f/10.21	Simple PLC first stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.22	Simple PLC second stage running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
f/10.23	Simple PLC 2nd stage acceleration/deceleration time selection	0 to 3	0	☆
f/10.24	Simple PLC 3rd stage running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
f/10.25	Simple PLC 3rd stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.26	Simple PLC 4th stage running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
f/10.27	Simple PLC 4th stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.28	Simple PLC 5th segment running time	0.0s(h) ～ 6500.0s(h)	0.0s(h)	☆
f/10.29	Simple PLC 5th stage acceleration and	0 to 3	0	☆

	deceleration time selection			
f/10.30	Simple PLC 6th segment running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
f/10.31	Simple PLC 6th stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.32	Simple PLC 7th segment running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
f/10.33	Simple PLC 7th stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.34	Simple PLC 8th segment running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
f/10.35	Simple PLC 8th stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.36	Simple PLC 9th segment running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
f/10.37	Simple PLC 9th stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.38	Simple PLC 10th segment running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
f/10.39	Simple PLC 10th stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.40	Simple PLC 11th segment running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
f/10.41	Simple PLC 11th stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.42	Simple PLC 12th segment running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
f/10.43	Simple PLC 12th stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.44	Simple PLC 13th segment running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
f/10.45	Simple PLC 13th stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.46	Simple PLC 14th segment running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
f/10.47	Simple PLC 14th stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.48	Simple PLC 15th segment running time	0.0s(h) ~ 6500.0s(h)	0.0s(h)	☆
f/10.49	Simple PLC 15th stage acceleration and deceleration time selection	0 to 3	0	☆
f/10.50	Simple PLC running time unit	0: s (seconds) 1: h (hour)	0	☆

f/10.51	Multi-segment instruction 0 setting mode	0: Function code F10.00 given 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE 5: PID 6: Preset frequency (F00.08) is given, UP/DOWN can be modified	0	☆
F10.5 2	Customized multi-speed mode settings	0~ 7	0	☆
F10.5 3	The first frequency	0.00HZ ~ (F00.12)	5.00	☆
F10.5 4	The first frequency running time	0.0 ~ 6553.5S	10	☆
F10.5 5	The second frequency	0.00HZ ~ (F00.12)	15.00	☆
F10.5 6	Second frequency operation time	0.0 ~ 6553.5S	10	☆
F10.5 7	The third frequency	0.00HZ ~ (F00.12)	25.00	☆
F10.5 8	The third frequency operation time	0.0 ~ 6553.5S	10	☆
F10.5 9	The fourth frequency	0.00HZ ~ (F00.12)	35.00	☆
f/10. 60	The fourth frequency operation time	0.0 ~ 6553.5S	10	☆
f/10. 61	The fifth frequency	0.00HZ ~ (F00.12)	45.00	☆
f/10. 62	The fifth frequency operation time	0.0 ~ 6553.5S	10	☆
F11 group swing frequency, fixed length and counting				
Function code	name	Setting range	Factory value	Change
F11.00	Frequency setting method	0: relative to the center frequency 1: Relative to the maximum frequency	0	☆
f/11.01	Swing frequency	0.0% ~ 100.0%	0.0%	☆
f/11.02	Jump frequency amplitude	0.0% ~ 50.0%	0.0%	☆
f/11.03	Swing frequency cycle	0.1s ~ 3000.0s	10.0s	☆
f/11.04	The rise time of the triangle wave of the swing frequency	0.1% ~ 100.0%	50.0%	☆
f/11.05	Set length	0m ~ 65535m	1000m	☆
f/11.06	Actual length	0m ~ 65535m	0m	☆
f/11.07	Pulses per meter	0.1 ~ 6553.5	100.0	☆
f/11.08	Set the count value	1 ~ 65535	1000	☆

f/11.09	Specifying count value	1 ~ 65535	1000	☆
F11.10~ f/11.14	reserve	—	0	☆
F12 Group Fault and Protection				
Function code	name	Setting range	Factory value	Change
F12.00	Motor overload protection selection	0: Disable 1: Allow	1	☆
f/12.01	Motor overload protection gain	0.20 ~ 10.00	1.00	☆
f/12.02	Motor overload warning factor	50% ~ 100%	80%	☆
f/12.03	Overvoltage stall gain	0 ~ 100	0	☆
f/12.04	Overvoltage stall protection voltage	200.0~ 2000.0	760.0	☆
f/12.05	Overcurrent stall gain	0 ~ 100	20	☆
f/12.06	Over-current stall protection current	100% ~ 200%	150%	☆
f/12.07	reserve	—	0	☆
f/12.08	Braking start voltage	200.0~ 2000.0V	690.0V	☆
f/12.09	Fault automatic reset times	0 ~ 200	0	☆
f/12.10	Fault during automatic fault reset Terminal output action selection	0: No action 1: Action	1	☆
f/12.11	Fault automatic reset interval	0.1s ~ 100.0s	6.0s	☆
f/12.12	Input phase loss protection selection	0: Disable (inverter power <= 11kW) 1: Allowed (inverter power>11kW)	Model confirmation	☆
f/12.13	Output phase loss protection selection	0: Disable 1: Allow	1	☆
f/12.14	First failure type	0: No fault 1: Keep 2: Accelerating overcurrent 3: Deceleration overcurrent 4: Constant speed overcurrent 5: Accelerating overvoltage 6: Deceleration overvoltage 7: Constant speed overvoltage 8: Buffer resistor overload	-	●
f/12.15	Second failure type		-	●
f/12.16	The third (most recent) fault type		-	●

		9: Undervoltage 10: Inverter overload 11: Motor overload 12: Input phase loss 13: Output phase loss 14: Module overheating 15: External fault 16: Communication abnormality 17: Reserved 18: Current detection abnormality 19: Motor tuning abnormality 20: Reserved 21: Parameter reading and writing exception 22: Inverter hardware abnormality 23: Reserved 24: Reserved 25: Reserved 26: Running time reached 27: Reserved 28: Reserved 29: Power-on time reached 30: Dropped 31: PID feedback lost during operation 40: Fast current limiting timeout 41: Switch motors during operation 42: Speed deviation is too large 43: Motor overspeed 45: Motor overtemperature 51: Initial position error		
f/12.17	Frequency of the third (most recent) fault	-	-	•
f/12.18	Current at the third (most recent) fault	-	-	•
f/12.19	Bus voltage at the third (most recent) fault	-	-	•

f/12.20	Input terminal status at the third (most recent) fault	-	-	●
f/12.21	Output terminal status at the third (most recent) fault	-	-	●
f/12.22	The inverter status at the third (most recent) fault	-	-	●
f/12.23	Power-on time at the third (most recent) fault	-	-	●
f/12.24	Running time at the third (most recent) failure	-	-	●
f/12.27	Second fault frequency	-	-	●
f/12.28	Second fault current	-	-	●
f/12.29	Bus voltage at the second fault	-	-	●
f/12.30	Input terminal for the second fault	-	-	●
f/12.31	Output terminal at the second fault	-	-	●
f/12.32	Inverter status at the second fault	-	-	●
f/12.33	Power-on time at the second fault	-	-	●
f/12.34	Second fault running time	-	-	●
f/12.37	First failure frequency	-	-	●
f/12.38	First fault current	-	-	●
f/12.39	Bus voltage at the first fault	-	-	●
f/12.40	Input terminal at first fault	-	-	●
f/12.41	Output terminal status at the first fault	-	-	●
f/12.42	Inverter status at the first fault	-	-	●
f/12.43	Power-on time at first fault	-	-	●
f/12.44	Running time at first failure	-	-	●
f/12.47	Fault protection action selection 1	Units: Motor overload (11) 0: Free parking 1: Stop according to the shutdown mode 2: Continue running Tens digit: Input phase loss (12) Hundreds digit: Output phase loss (13)	00000	☆

		Thousands: External fault (15) Ten thousand digit: Communication abnormality (16)		
f/12.48	Fault protection action selection 2	Units: Reserved 0: Free parking Tens digit: Function code read and write abnormality (21) 0: Free parking 1: Stop according to the shutdown mode Hundreds place: Reserved Thousands: Motor overheating (25) Ten thousandth digit: running time reached (26)	00000	☆
f/12.49	Fault protection action selection 3	Units: User-defined fault 1 (27) 0: Free parking 1: Stop according to the shutdown mode 2: Continue running Tens digit: User-defined fault 2 (28) 0: Free parking 1: Stop according to the shutdown mode 2: Continue running Hundreds digit: Power-on time reached (29) 0: Free parking 1: Stop according to the shutdown mode 2: Continue running Thousands: Dropped load (30) 0: Free parking 1: Slow down and stop 2: Jump directly to 7% of the motor rated frequency and continue running. Automatically restore to the set frequency when no load is lost Ten thousandths: PID feedback loss during operation (31) 0: Free parking 1: Stop according to the shutdown mode	00000	☆

		2: Continue running		
f/12.50	Fault protection action selection 4	Units: Speed deviation is too large (42) 0: Free parking 1: Stop according to the shutdown mode 2: Continue running Tens, hundreds, thousands, and tens of thousands: reserved	00000	☆
f/12.54	Continue to run frequency selection when fault occurs	0: Run at the current operating frequency 1: Run at the set frequency 2: Run at upper frequency limit 3: Run at the lower frequency limit 4: Running at abnormal standby frequency	0	☆
f/12.55	Abnormal backup frequency	0.0% ～ 100.0% (100.0% corresponds to the maximum frequency F00.10)	100.0%	☆
f/12.56	Motor temperature sensor type	0: No temperature sensor 1: PT100 2: PT1000	0	☆
f/12.57	Motor overheat protection threshold	0℃～ 200℃	110℃	☆
f/12.58	Motor overheat warning threshold	0℃～ 200℃	90℃	☆
f/12.59	Instantaneous power failure action selection	0: Invalid 1: Slow down 2: Deceleration and stop	0	☆
f/12.60	Momentary stop action pause judgment voltage	80.0% ～ 100.0%	85.0 %	☆
f/12.61	Instantaneous power outage voltage recovery judgment time	0.00s ～ 100.00s	0.50s	☆
f/12.62	Instantaneous power failure action judgment voltage	60.0% ~ 100.0% (standard bus voltage)	80.0%	☆
f/12.63	Load drop protection option	0: Invalid 1: Valid	0	☆
f/12.64	Load drop detection level	0.0～100.0%	10.0%	☆
F12.65	Load drop detection time	0.0～60.0s	1.0s	☆
f/12.66	reserve	—	0	☆

f/12.67	reserve	—	0	☆
f/12.68	SVC speed deviation too large detection value	0.0%～50.0% (maximum frequency)	20.0%	☆
f/12.69	SVC speed deviation excessive detection time	0.0s: No detection 0.1 ～ 60.0s	0 .0s	☆
f/12.70	Instantaneous power failure without stopping gain K p	0 ～ 100	40	☆
f/12.71	Instantaneous stop and non-stop integral coefficient Ki	0 ～ 100	30	☆
f/12.72	Momentary stop and non-stop action deceleration time	0.0 ～ 300.0s	20.0s	☆
F13 Group communication parameters				
Function code	name	Setting range	Factory value	Change
F13.00	MODBUS communication baud rate	0-1: Reserved 2: 1200BPS 3: 2400BPS 4:4800BPS 5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS	5	☆
f/13.01	MODBUS Data Format	0: No check (8-N-2) 1: Even parity (8-E-1) 2: Odd parity (8-O-1) 3: No check (8-N-1)	0	☆
f/13.02	Local address	0: Broadcast address 1 ~ 247	1	☆
f/13.03	MODBUS reply delay	0～20ms	2	☆
f/13.04	RS485 communication timeout	0.0: Invalid 0.1 ～ 60.0s	0.0s	☆
f/13.05	MODBU protocol selection	0: Non-standard MODBUS protocol 1: Standard MODBUS protocol	0	☆

f/13.06	RS485 communication read current resolution	0:0.01A 1:0.1A	0	☆
F13.07	reserve	reserve	0	☆
F13.08	RS485 communication timeout detection selection	0: valid throughout the whole process 1: invalid during shutdown	0	☆
F14 Group Keyboard and Display				
Function code	name	Setting range	Factory value	Change
F14.00	FUNC key function selection	0: FUNC key is invalid 1: Switch between the operation panel command channel and the remote command channel (terminal command channel or communication command channel) 2: Forward and reverse switching 3: Forward jog 4: Reverse jog Note: When F14.00=1, the auxiliary display unit digit digital tube dots flash slowly at intervals of 1s when switched to the terminal operation command channel; the auxiliary display unit digit digital tube dots flash quickly at intervals of 200ms when switched to the communication operation command channel.	3	★
f/14.01	STOP/RESET key function	0: The STOP/RES key stop function is valid only in keyboard operation mode. 1: In any operation mode, the STOP/RES key stop function is valid	1	☆
f/14.02	LED operation main display parameters 1	0000 ～ FFFF Bit00: Operating frequency 1 (Hz) Bit01: Set frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW)	1F	☆

		Bit06: Output torque (%) Bit07: Terminal input status Bit08: Terminal output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Pressure feedback (MPa, Kg) Bit12: Count value Bit13: length value Bit14: Load speed display Bit15: PID setting		
f/14.03	LED operation main display parameters 2	0000 ~ FFFF Bit00: PID feedback Bit01: PLC stage Bit02: PULSE input pulse frequency (kHz) Bit03: Operating frequency 2 (Hz) Bit04: Remaining running time Bit05: AI1 voltage before correction (V) Bit06: AI2 voltage before correction (V) Bit07: Pressure setting (MPa, Kg) Bit08: Line speed Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: PULSE input pulse frequency (Hz) Bit12: Communication setting value Bit13: Reserved Bit14: Main frequency A display (Hz) Bit15: Auxiliary frequency B display (Hz)	0	☆
f/14.04	LED shutdown main display parameters	0000 ~ FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: Terminal input status Bit03: Terminal output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: Panel potentiometer voltage (V)	33	☆

		Bit07: Count value Bit08: length value Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: PULSE input pulse frequency (kHz) Bit1 3 : Set pressure (MPa, Kg) Bit1 4 : Input voltage (V) Bit1 5 : Operating frequency 1 (Hz)		
f/14.05	LED operation auxiliary display parameters	0 ~ 80	4	☆
f/14.06	LED shutdown auxiliary display parameters	0 ~ 80	38	☆
f/14.07	Load speed display factor	0.0001 ～ 6.5000	1.0000	☆
f/14.08	Inverter module heat sink temperature	0.0℃～ 100.0℃	-	●
f/14.09	Cumulative running time	0h ～ 65535h	-	●
f/14.10	Speed display decimal places	LED units: load speed (d00.14) display coefficient 0: 0 decimal places 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places LED tens place: feedback speed (d00.19) display coefficient 1: 1 decimal place 2: 2 decimal places	twenty one	☆
f/14.11	Cumulative power-on time	0 to 65535 hours	-	●
f/14.12	Cumulative power consumption	0 ~ 65535 degrees	-	●
f/14.13	Hardware version number	-	-	●
f/14.14	Software version number	-	-	●
f/14.15	Software batch number	-	3.0 410	●
F15 group function code management				
Function code	name	Setting range	Factory value	Change

F15.00	User Password	0 ~ 65535	0	☆
f/15.01	Parameter initialization	0: No operation 1: All user parameters except motor parameters are restored to factory settings 2: All user parameters are restored to factory settings 3: Clear record information	0	★
f/15.02	Function code modification properties	0: Editable 1: Unmodifiable	0	☆
f/15.03	reserve	—	0	●
f/15.04	reserve	—	0	●
F15.0 5	Run restrictions password	0 ~ 65535 Note: After the password takes effect, F02.16 and F02.17 are prohibited from being set	0 0000	★
F16 Group Water Supply Parameters				
Function code	name	Setting range	Factory value	Change
F16.00	Terminal connection and disconnection delay	0.0～6000.0s	0.1	☆
F16.01	Polling time	0.0～6000.0h	48.0	☆
f/16.02	Pump reduction lower frequency	0.0～ Upper frequency limit	35.00	☆
f/16.03	Pump delay time	0.0～3600.0s	5.0	☆
f/16.04	Pump reduction delay time	0.0～3600.0s	5.0	☆
f/16.05	Pump sleep waiting time	0.0～3600.0s	2.0	☆
f/16.06	Water pump wake-up waiting time	0.0～3600.0s	1.0	☆
f/16.07	Water pump wake-up pressure point	(0.0～100.0%)*(F16.08)	80.0%	☆
f/16.08	Preset pressure	0.00～F16.09 (MPa, Kg)	5.00	☆
f/16.09	Sensor range	0.00～100.00 (MPa、Kg)	10.00	☆
f/16.10	Solar panel maximum power node	0.0%～100.0%	81.0	☆
f/16.11	VF speed adjustment coefficient	0.000～2.000	1.000	☆
f/16.12	MPPT high point working voltage	(F16.1 3)～200.0%	100.0%	☆
f/16.13	MPPT low point working voltage	0.0%～ (F16.1 2)	75.0%	☆
f/16.14	MPPT high point voltage frequency	0.00Hz～maximum frequency (F00.10)	50.00	☆

	point			
f/16.15	MPPT low point voltage frequency point	0.00Hz～maximum frequency (F00.10)	0.00	☆
f/16.16	MPPT low voltage protection point	40.0 %～ 100.0 %	45.0%	☆
f/16.17	Water shortage detection starting frequency	0.00Hz～maximum frequency (F00.10)	10.00	☆
f/16.18	The ratio of photovoltaic water pump water shortage detection current to no-load current	0.0%～300.0%* no-load current (F03.10)	0.0	☆
f/16.19	Photovoltaic water pump water shortage detection time	0～6000.0s	0.0	☆
f/16.20	Photovoltaic undervoltage self-start delay	0.1～6000.0s (0.0 value turns off automatic start)	2.0	☆
f/16.21	Photovoltaic water shortage self-start delay	0.1～6000.0s (0.0 value turns off automatic start)	15.0	☆
f/16.22	Power search time	0.050～60.000	0.500	☆
f/16.23	Power search gain	10～500	125	☆
f/16.24	Power search speed gain	1～1000	100	☆
f/16.25	Pre-search upsampling time	0.01～600.00s	15.00	☆
f/16.26	Pre-search frequency reduction time	0.01～600.00s	15.00	☆
f/16.2 7	Pump sleep frequency	0.0 0 ~ Upper limit frequency (F00.12)	20 .00	☆
F17 Group Control Optimization Parameters				
Function code	name	Setting range	Factory value	Change
F17.00	DPWM switching upper limit frequency	0.00Hz ~ maximum frequency (F00.10)	8.00Hz	☆
f/17.01	PWM modulation method	0: Asynchronous modulation 1: Synchronous modulation	0	☆
f/17.02	Dead zone compensation mode selection	0: No compensation 1: Compensation mode	1	☆
f/17.03	Random PWM Depth	0: Random PWM is invalid 1 to 10: PWM carrier frequency random depth	0	☆
f/17.04	Wave-by-wave current limiting enable	0: Disable 1: Enable	1	☆
f/17.05	Voltage overmodulation factor	100～ 110	105	☆

f/17.06	Undervoltage point setting	200.0V ～ 2 0 00.0V	350.0V	☆
f/17.07	reserve	—	0	☆
f/17.08	Overvoltage point setting	200.0V ～ 2200.0V	Model confirmation	★
F18 AI curve setting				
Function code	name	Setting range	Factory value	Change
F18.00	AI curve 4 minimum input	—10.00V ～ F18.02	0.00V	☆
F18.01	AI setting curve 4 minimum input corresponding setting	-100.0% ～ +100.0%	0.0%	☆
f/18.02	AI curve 4 inflection point 1 input	F18.00 to F18.04	3.00V	☆
f/18.03	AI curve 4 inflection point 1 input corresponding setting	-100.0% ～ +100.0%	30.0%	☆
f/18.04	AI curve 4 inflection point 2 input	F18.02 to F18.06	6.00V	☆
f/18.05	AI curve 4 inflection point 2 input corresponding setting	-100.0% ～ +100.0%	60.0%	☆
f/18.06	AI Curve 4 Maximum Input	F18.06 ～ +10.00V	10.00V	☆
f/18.07	AI curve 4 maximum input corresponding setting	-100.0% ～ +100.0%	100.0%	☆
f/18.08	AI Curve 5 Minimum Input	—10.00V ～ F18.10	-10.00V	☆
f/18.09	AI curve 5 minimum input corresponding setting	-100.0% ～ +100.0%	—100.0%	☆
f/18.10	AI curve 5 inflection point 1 input	F18.08 to F18.12	-3.00V	☆
f/18.11	AI curve 5 inflection point 1 input corresponding setting	— 1 00.0% ～ +100.0%	-30.0%	☆
f/18.12	AI Curve 5 Inflection Point 2 Input	F18.10 to F18.14	3.00V	☆
f/18.13	AI curve 5 inflection point 2 input corresponding setting	-100.0% ～ +100.0%	30.0%	☆
f/18.14	AI Curve 5 Maximum Input	F18.12 ～ +10.00V	10.00V	☆
f/18.15	AI curve 5 maximum input corresponding setting	-100.0% ～ +100.0%	100.0%	☆
F18. 16	AI1 sets the jump point	—100.0% ～ 100.0%	0.0%	☆
F18. 17	AI1 sets the jump range	0.0% ～ 100.0%	0.1 %	☆
F18. 18	AI2 set jump point	—100.0% ～ 100.0%	0.0%	☆

F18. 19	AI2 sets the jump range	0.0% ～ 100.0%	0.1 %	☆
F18.2 0	Panel potentiometer setting jump point	—100.0% ～ 100.0%	0.0%	☆
F18.2 1	Panel potentiometer sets the jump amplitude	0.0% ～ 100.0%	0.1 %	☆
FFF group factory parameters				
Function code	name	Setting range	Factory value	Change
FFF.00	Manufacturer password	0 to 65535	0	★
Group d00 Basic monitoring parameters				
Function code	name		Factory value	Change
d00.00	Operating frequency (Hz)		0.01Hz	7000H
d00.01	Set frequency (Hz)		0.01Hz	7001H
d00.02	Bus voltage (V)		0.1V	7002H
d00.03	Output voltage(V)		1V	7003H
d00.04	Output current(A)		0.01A	7004H
d00.05	Output power (kW)		0.1kW	7005H
d00.06	Output torque(%)		0.10%	7006H
d00.07	Terminal input status		1	7007H
d00.08	Terminal output status		1	7008H
d00.09	AI1 voltage (V)/current (mA)		0.01V/0.01mA	7009H
d00.10	AI2 voltage (V)		0.01V	700AH
d00.11	Pressure feedback (MPa, Kg)		0.00	700BH
d00.12	Count value		1	700CH
d00.13	Length value		1	700 DH
d00.14	Load speed display		1	700EH
d00.15	PID Setting		1	700FH
d00.16	PID Feedback		1	7010H
d00.17	PLC stage		1	7011H
d00.18	PULSE Input pulse frequency (Hz)		0.01kHz	7012H
d00.19	Feedback speed (Hz)		0.01Hz	7013H
d00.20	Remaining running time		0.1Min	7014H

d00.21	AI1 voltage (V)/current (mA) before correction	0.001V/0.01mA	7015H
d00.22	AI2 voltage before correction (V)	0.001V	7016H
d00.23	Pressure setting (MPa, Kg)	0.00	7017H
d00.24	Line speed	1m/Min	7018H
d00.25	Current power-on time	1Min	7019H
d00.26	Current running time	0.1Min	701AH
d00.27	PULSE Input pulse frequency	1Hz	701BH
d00.28	Communication setting value	0.01%	701CH
d00.29	reserve	0	701 D H
d00.30	Main frequency A display	0.01Hz	701FH
d00.31	Auxiliary frequency B display	0.01Hz	701FH
d00.32	Inverter rated current	0	7020H
d00.33	reserve	0	7021H
d00.34	Motor temperature value	1℃	7022H
d00.35	Target torque(%)	0.1%	7023H
d00.36	reserve	0	7024H
d00.37	Power factor perspective	0.1°	7025H
d00.38	Input voltage (V)	0.0 V	7026H
d00.39	VF separation target voltage	1V	7027H
d00.40	VF separation output voltage	1V	7028H
d00.41	Intuitive display of input terminal status	1	7029H
d00.42	Output terminal status intuitive display	1	702AH
d00.43	Input terminal function status intuitive display 1 (function 01-function 40)	1	702BH
d00.44	Input terminal function status visual display 2 (function 41-function 80)	1	702CH
d00.45	Fault Information	1	702DH
d00.58	reserve	0	703AH
d00.59	Set frequency (%)	0.01%	703BH
d00.60	Operating frequency(%)	0.01%	703CH
d00.61	Inverter status	1	703DH
d00.62	Current fault code	1	703EH
d00.63	reserve	0.00%	703FH
d00.64	reserve	0.01%	7040H

d00.65	Torque upper limit	0.10%	7041H
d00.66	Motor speed (RPM/min)	0	7042H
d00.67 ～ d00.78	reserve	-	-
d00.79	Set temperature	1 ℃	704FH

Chapter 7 EMC (Electromagnetic Compatibility)

7.1 Definitions

Electromagnetic compatibility means that electrical equipment can operate in an environment with electromagnetic interference without interfering with the electromagnetic environment and can stably achieve its Functional capabilities.

7.2 Introduction to EMC Standards

According to the requirements of national standard GB/T12668.3 , the inverter needs to meet the requirements of electromagnetic interference and anti-electromagnetic interference.

Our existing products implement the latest international standards: IEC / EN 61800-3 : 2004 (Adjustable speed electrical power drive systems part 3: EMC requirements and specific test methods), which is equivalent to the national standard GB/T12668.3 .

IEC/EN61800-3 mainly examines the inverter from two aspects: electromagnetic interference and anti-electromagnetic interference. Test the radiated interference, conducted interference and harmonic interference of the inverter (this requirement applies to inverters used for civil purposes). Electromagnetic interference mainly tests the inverter's conducted immunity, radiation immunity, surge immunity, fast mutation pulse group immunity, ESD immunity and power supply low-frequency end immunity (specific test items are:

1. Immunity test for input voltage sag, interruption and change;
2. Commutation notch immunity test;
3. Harmonic input immunity test;
4. Input frequency change test;
5. Input voltage imbalance test;
6. Input voltage fluctuation test). According to the strict requirements of IEC/EN61800-3 , our products are installed and used according to the guidance shown in 7.3 , and will have good electromagnetic compatibility in general industrial environments.

7.3 EMC Guidance

7.3.1 Impact of harmonics:

The high-order harmonics of the power supply can damage the inverter. Therefore, in some places where the quality of the power grid is relatively poor, it is recommended to install an AC input reactor.

7.3.2 Electromagnetic interference and installation precautions:

There are two types of electromagnetic interference. One is the interference of electromagnetic noise in the surrounding environment to the inverter, and the other is the interference generated by the inverter to surrounding equipment.

Installation Notes:

1) The grounding wires of the inverter and other electrical products should be well grounded;

2) The power input and output lines of the inverter and the weak current signal lines (such as control lines) should not be arranged in parallel. When the parts are arranged vertically;

3) It is recommended to use shielded cables or steel pipes to shield the output power lines of the inverter, and the shielding layer should be reliably connected to the For the leads of the interfered equipment, it is recommended to use twisted-pair shielded control cables and ground the shielding layer reliably;

4) For motor cables longer than 100m , an output filter or reactor is required.

7.3.3 How to deal with the interference of surrounding electromagnetic equipment to the inverter:

Generally, the reason for electromagnetic influence on the inverter is that a large number of relays, contactors or electromagnetic brakes are installed near the inverter. When the inverter is disturbed and malfunctions, it is recommended to use the following solutions:

1) Install surge suppressors on devices that generate interference;

2) Install a filter at the input end of the inverter. Refer to 7.3.6 for details .

3) Use shielded cables for the inverter control signal lines and detection line leads, and ground the shielding layer reliably.

7.3.4 Solutions for the interference caused by the inverter to the peripheral equipment:

There are two types of noise: one is the inverter radiation interference, and the other is the inverter conduction interference. These two types of interference cause the surrounding electrical equipment to be affected by electromagnetic or electrostatic induction, which in turn causes the equipment to malfunction. Please refer to the following methods to solve the situation:

1) The signals of the instruments, receivers and sensors used for measurement are generally weak. When in the same control cabinet, it is easy to be disturbed and malfunction. It is recommended to use the following methods to solve it: Try to stay away from interference Do not lay signal lines and power lines in parallel, especially do not bundle them together; Use shields for signal lines and power lines. Shielded wires and good grounding; add a ferrite ring on the output side of the inverter (select a

suppression frequency within the range of 30 to 1000MHz) and wind 2 to 3 turns in the same direction . For severe conditions, you can choose to install an EMC output filter;

2) When the interfered equipment and the inverter use the same power supply, it will cause conducted interference. If the above methods cannot eliminate it, If there is interference, an EMC filter should be installed between the inverter and the power supply (refer to 7.3.6 for selection);

3) The peripheral equipment is grounded separately to eliminate the interference caused by leakage current in the inverter grounding wire when the ground is shared.

7.3.5 Leakage current and treatment:

There are two forms of leakage current when using a frequency converter: one is the leakage current to the ground; the other is the leakage current between lines.

1) Factors affecting ground leakage current and solutions:

There is distributed capacitance between the conductor and the earth. The larger the distributed capacitance, the greater the leakage current. Effectively reduce the distance between the inverter and the motor to Reduce distributed capacitance. The higher the carrier frequency, the greater the leakage current. You can reduce the carrier frequency to reduce leakage current. However, reducing the carrier frequency will This will cause the motor noise to increase. Please note that installing a reactor is also an effective way to solve the leakage current problem.

The leakage current will increase as the loop current increases, so when the motor power is large, the corresponding leakage current is large.

2) Factors causing leakage current between lines and solutions:

There is distributed capacitance between the inverter output wiring. If the current passing through the line contains high-order harmonics, it may cause resonance and generate Leakage current. If a thermal relay is used at this time, it may cause malfunction.

The solution is to reduce the carrier frequency or install an output reactor. When using the inverter, it is recommended that there is no Install a thermal relay and use the electronic overcurrent protection function of the inverter.

7.3.6 Notes on installing EMC input filter at the power input:

1) ⚠Note : Please use the filter strictly according to the rated value; since the filter is a Class I electrical appliance, the metal outer shell of the filter The shell ground should have good contact with the metal ground of the installation cabinet over a large area and should have good conductive continuity, otherwise there will be a risk of contact. Electrical hazards and serious impact on EMC effects;

2) Through EMC testing, it is found that the filter ground must be connected to the same common ground as the inverter PE terminal ground, otherwise it will seriously affect Impact EMC effect.

3) Install the filter as close as possible to the power input terminal of the inverter.

Chapter 8 Fault diagnosis and countermeasures

8.1 Fault alarm and countermeasures

During operation, if an abnormality occurs, the inverter will immediately block the PWM output and enter the fault protection state. At the same time, the fault code displayed on the keyboard flashes to indicate the current fault information. At the same time, the fault indicator ALM lights up. At this time, you need to check the cause of the fault and the corresponding treatment method according to the prompts in this

section. If the problem still cannot be solved, please contact our company directly. For the corresponding solutions, please refer to Table 9-1 Fault Diagnosis and Troubleshooting.

Fault name	Operation panel show	Troubleshooting	Troubleshooting measures
Inverter unit protection	E-01	1. The inverter output circuit is short-circuited 2. The wiring between the motor and the inverter is too long 3. Module overheating 4. The internal wiring of the inverter is loose 5. Main control board abnormality 6. Driver board abnormality 7. Inverter module abnormality	1. Eliminate peripheral faults 2. Install a reactor or output filter 3. Check whether the air duct is blocked and whether the fan is working properly. Works normally and eliminates existing problems 4. Plug in all cables 5. Seek technical support 6. Seek technical support 7. Seek technical support
Accelerating overcurrent	E-02	1. The inverter output circuit is grounded or short-circuited 2. The control mode is vector and no parameter identification is performed 3. The acceleration time is too short 4. Manual torque boost or inappropriate V/F curve 5. Low voltage 6. Start the rotating motor 7. Sudden load during acceleration 8. The inverter is too small	1. Eliminate peripheral faults 2. Perform motor parameter identification 3. Increase acceleration time 4. Adjust the manual boost torque or V/F curve 5. Adjust the voltage to the normal range 6. Select speed tracking start or wait for the motor to stop Restart after 7. Cancel sudden load 8. Choose a frequency converter with a higher power rating
Deceleration overcurrent	E-03	1. The inverter output circuit is grounded or short-circuited 2. The control mode is vector and parameter identification is not performed 3. The deceleration time is too short 4. Low voltage 5. Sudden load increase during deceleration 6. No brake unit and brake resistor are installed	1. Eliminate peripheral faults 2. Perform motor parameter identification 3. Increase deceleration time 4. Adjust the voltage to the normal range 5. Cancel sudden load 6. Install brake unit and resistor

Constant speed overcurrent	E-04	1. The inverter output circuit is grounded or short-circuited 2. The control mode is vector and parameter identification is not performed 3. Low voltage 4. Is there any sudden load during operation? 5. The inverter is too small	1. Eliminate peripheral faults 2. Perform motor parameter identification 3. Adjust the voltage to the normal range 4. Cancel sudden load 5. Choose a frequency converter with a higher power rating
Accelerating overvoltage	E-05	1. Input voltage is too high 2. There is an external force dragging the motor to run during acceleration 3. Acceleration time is too short 4. No brake unit and brake resistor are installed	1. Adjust the voltage to the normal range 2. Cancel the external power or install a braking resistor 3. Increase acceleration time 4. Install brake unit and resistor
Deceleration overvoltage	E-06	1. Input voltage is too high 2. There is an external force dragging the motor to run during deceleration 3. Deceleration time is too short 4. No brake unit and brake resistor are installed	1. Adjust the voltage to the normal range 2. Cancel the external power or install a braking resistor 3. Increase deceleration time 4. Install brake unit and resistor
Constant speed overvoltage	E-07	1. Input voltage is too high 2. There is external force dragging the motor during operation. OK	1. Adjust the voltage to the normal range 2. Cancel the external power or install a braking resistor
Control power failure	E-08	1. The input voltage is not within the specified range	1. The input voltage is not within the specified range
Undervoltage fault	E-09	1. Momentary power outage 2. The voltage at the inverter input terminal is not within the range required by the specification 3. Bus voltage is abnormal 4. The rectifier bridge and buffer resistor are abnormal 5. Driver board abnormality 6. Control panel abnormality	1. Reset fault 2. Adjust the voltage to the normal range 3. Seek technical support 4. Seek technical support 5. Seek technical support 6. Seek technical support

Inverter overload	E-10	1. Is the load too large or the motor is blocked? 2. The inverter is too small	1. Reduce the load and check the motor and mechanical condition 2. Choose a frequency converter with a higher power rating
Motor overload	E-11	1. The three-phase input power supply is abnormal 2. Driver board abnormality 3. Abnormal lightning protection board 4. Main control board abnormality	1. Check and eliminate problems in peripheral circuits. Question 2: Seeking technical support 3. Seek technical support 4. Seek technical support
Input phase loss	E-12	1. The three-phase input power supply is abnormal 2. Driver board abnormality 3. Abnormal lightning protection board 4. Main control board abnormality	1. Check and eliminate problems in peripheral lines 2. Seek technical support 3. Seek technical support 4. Seek technical support
Output phase loss	E-13	1. The lead from the inverter to the motor is abnormal 2. The three-phase output of the inverter is unbalanced when the motor is running. 3. Driver board abnormality 4. Module abnormality	1. Eliminate peripheral faults 2. Check whether the three-phase windings of the motor are normally arranged in parallel Troubleshooting 3. Seek technical support 4. Seek technical support
Module overheating	E-14	1. The ambient temperature is too high 2. Air duct blockage 3. Fan damage 4. The module thermistor is damaged 5. Inverter module is damaged	1. Reduce ambient temperature 2. Clean the air duct 3. Replace the fan 4. Replace the thermistor 5. Replace the inverter module
External device failure	E-15	1. Input external fault signal through multi-function terminal X	1. Reset operation
Communication failure	E-16	1. The host computer is not working properly 2. The communication line is abnormal 3. Communication expansion card F00.28 is set incorrectly 3. Communication parameter F13 group settings are incorrect	1. Check the host computer wiring 2. Check the communication connection line 3. Correctly set the communication expansion card type 4. Set communication parameters correctly

Current detection fault	E-18	1. Check if the Hall device is abnormal 2. Driver board abnormality	1. Replace the Hall device 2. Replace the driver board
Motor tuning failure	E-19	1. The motor parameters are not set according to the nameplate 2. Parameter identification process timeout	1. Correctly set the motor parameters according to the nameplate 2. Check the leads from the inverter to the motor
EEPROM Read and write failure	E-21	1. EEPROM chip is damaged	1. Replace the main control board
Inverter Hardware Fault	E-22	1. Overvoltage 2. Overcurrent	1. Overvoltage fault handling 2. Handle according to overcurrent fault
Cumulative running time Arrival Failure	E-26	1. The cumulative running time reaches the set value	1. Use the parameter initialization function to clear the record information interest
User-defined Fault 1	E-27	1. Input the signal of user-defined fault 1 through multi-function terminal X	1. Reset operation
User-defined Fault 2	E-28	1. Input the signal of user-defined fault 2 through multi-function terminal X	1. Reset operation
Cumulative power-on time Arrival Failure	E-29	1. The cumulative power-on time reaches the set value	1. Use the parameter initialization function to clear the record information interest
Load drop fault	E-30	1. The inverter operating current is less than F12-64	1. Check whether the load is detached or F12-64, Whether the F12-65 parameter setting conforms to the actual operating conditions
Runtime PID Feedback loss fault	E-31	1. PID feedback is less than the setting value of F09.26	1. Check the PID feedback signal or set F09.26 to a suitable value.
Wave-by-wave current limiting fault	E-40	1. Is the load too large or the motor is blocked? 2. The inverter is too small	1. Reduce the load and check the motor and mechanical condition 2. Choose a frequency converter with a higher power rating
Speed deviation is too large Fault	E-42	1. No parameter identification 2. The speed deviation detection parameters F12.68 ~ F12.69 are set unreasonably.	1. Identify motor parameters 2. Reasonably set the detection parameters according to the actual situation

Initial position error	E-51	1. The motor parameters deviate too much from the actual ones	1. Re-confirm whether the motor parameters are correct. Pay attention to whether the rated current is set too small
Master-slave control slave failure	E-55	The slave fails. Check the slave.	Start troubleshooting according to the slave fault code
Brake pipe protection failure	E-60	The brake resistor is short-circuited or the brake module is abnormal.	Check the brake resistor or seek technical support
Photovoltaic water shortage detection fault	E-65	Photovoltaic water pump water shortage detection fault	See the description of F16.10～F16.26 for details

Common faults and their solutions

Serial number	Fault phenomenon	Possible causes	Workaround
1	No display after power on	The grid voltage is not available or is too low; The switch power supply on the inverter drive board is faulty; The rectifier bridge is damaged; The inverter buffer resistor is damaged; Control panel or keyboard failure; The connection between the control board, driver board and keyboard is broken.	Check the input power; Check bus voltage; Seek manufacturer services;
2	"P.OFF" is displayed after power on	The connection between the driver board and the control board is poor; Related components on the control board are damaged; The motor or motor wire is short-circuited to ground; Hall fault; Grid voltage is too low	Seek manufacturer services;
3	The inverter displays normal	The fan is damaged or blocked;	Replace the fan;

	after power-on. After running, it displays "P.OFF" and stops immediately.	The peripheral control terminal wiring is short-circuited;	Eliminate external short circuit fault;
4	Frequent E-14 (module overheating) faults	The carrier frequency is set too high. The fan is damaged or the air duct is blocked. The internal components of the inverter are damaged (thermocouple or other)	Reduce carrier frequency (F00.15); Replace the fan and clean the air duct; Seek manufacturer services;
5	The motor does not rotate after the inverter is running.	Motors and motor cables; Inverter parameter setting error (motor parameters); The connection between the drive board and the control board is poor; Driver board failure;	Reconfirm the connection between the inverter and the motor; Replace the motor or clear the mechanical fault; Check and reset the motor parameters;
6	The X terminal fails.	Parameter setting error; External signal error; Control board failure;	Check and reset the relevant parameters of group F07; Reconnect the external signal cable; Seek manufacturer services;
7	The inverter frequently reports overcurrent and overvoltage faults.	The motor parameters are set incorrectly; The acceleration and deceleration time is not appropriate; Load fluctuations;	Reset motor parameters or perform motor tuning; Set appropriate acceleration and deceleration time; Seek manufacturer services;
8	All digital tubes light up when powered on	Related components on the control board are damaged;	Replace the control board;

Appendix 1: Modbus Communication Protocol

H900 series inverter provides RS485 communication interface and supports Modbus-RTU slave communication protocol.
Computer or PLC realizes centralized control, sets the inverter operation command through this communication protocol, modifies or reads the function code parameters,
Get the working status and fault information of the inverter.

1. Contents of the Agreement

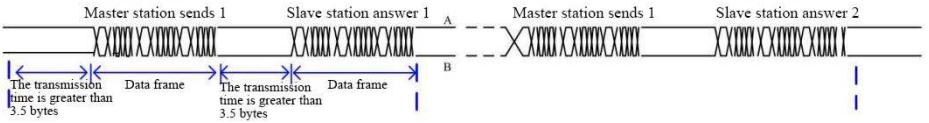
The serial communication protocol defines the information content and format used in serial communication. It includes: host polling (or broadcasting)
Format: The encoding method of the host, including: the function code of the required action, the transmission data and error checking, etc.
The response of the slave
It also uses the same structure, including: action confirmation, return data and error checking, etc.
If an error occurs or the action requested by the host cannot be completed, it will organize a fault message as a response to the host.

2. Application

The inverter is connected to a "single master and multiple slaves" PC/PLC control network with RS485 bus as a communication slave.

3. Bus structure

(1) Hardware interface
The inverter terminals 485+ and 485- are Modbus communication interfaces.
(2) Topological structure
Single host and multiple slave systems. Each communication device in the network has a unique slave address. One of the devices acts as the communication host (usually a PC host, PLC, HMI, etc.), actively initiates communication, and performs parameter read or write operations on the slave. The other devices act as communication slaves, responding to the host's inquiries or communication operations on the local device. Only one device can send data at the same time, while the other devices are in the receiving state. The setting range of the slave address is 1 to 247, and 0 is the broadcast communication address. The slave address in the network must be unique.
(3) Communication transmission method
Asynchronous serial, half-duplex transmission mode. In the process of serial asynchronous communication, data is sent in the form of messages, one frame of data at a time. The MODBUS-RTU protocol stipulates that when the idle time without data on the communication data line is greater than the transmission time of 3.5 bytes, it indicates the start of a new communication frame.

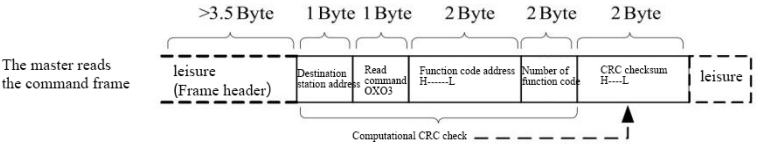


The built-in communication protocol of the H900 series inverter is the Modbus-RTU slave communication protocol, which can respond to the host's "query/command", or take corresponding actions according to the host's "query/command", and communicate data responses.

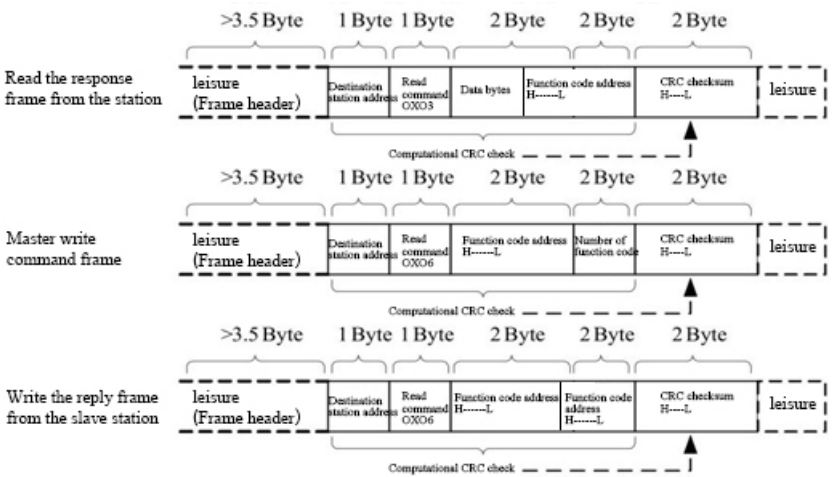
The host can refer to a personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc. The host can communicate with a slave individually, and can also issue broadcast information to all subordinate slaves. For the host's individual access "query/command", the accessed slave must return a response frame; for the broadcast information sent by the host, the slave does not need to feedback the response to the host.

4. Communication data structure

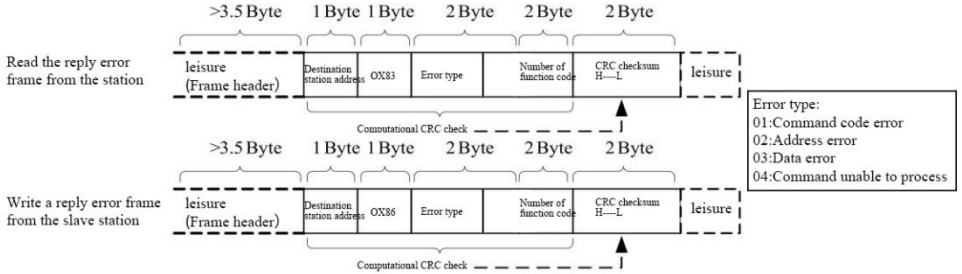
H900 series inverter is as follows. The inverter only supports the reading or writing of Word type parameters. The corresponding communication read operation command is 0x03; the write operation command is 0x06. It does not support byte or bit read and write operations:



Theoretically, the host computer can read several consecutive function codes at a time (i.e., n can be up to 12), but be careful not to skip the last function code of this function code group, otherwise an error will be reported.



If the slave detects a communication frame error, or read/write failures due to other reasons, it will reply with an error frame.



Data frame field description:

Frame header START	Idle time greater than 3.5 character transmission times
Slave address ADR	Communication address range: 1 ~ 247; 0 = broadcast address
Command code CMD	03: Read slave parameters; 06: Write slave parameters
Function code address H	The parameter address inside the inverter is expressed in hexadecimal. It is divided into function code type and non-function code type (such as running status parameters, running commands, etc.) parameters, etc. For details, see address definition. When transmitting, the high byte comes first and the low byte comes last.
Function code address L	
Function code number H	The number of function codes read in this frame, if it is 1, it means 1 function code is read. When transmitting, the high byte is in front and the low byte is in the back. This protocol can only rewrite 1 function code at a time and does not have this field.
Function code number L	
Data H	The response data, or the data to be written, is transmitted with the high byte first and the low byte last.
Data L	
CRC CHK high	Test value: CRC16 check value. When transmitting, the high byte is in front and the low byte is in the back. For the calculation method, please refer to the description of CRC check in this section.
CRC CHK low	
END	3.5 characters

CRC verification method:

CRC (Cyclical Redundancy Check) uses the RTU frame format, and the message includes an error detection field based on the CRC method. The CRC field detects the content of the entire message. The CRC field is two bytes, containing a 16-bit binary value. It is calculated by the transmission device and added to the message. The receiving device recalculates the CRC of the received message and compares it with the value in the received CRC field. If the two CRC values are not equal, it means that there is an error in the transmission.

CRC is first stored in 0xFFFF, and then a process is called to process the continuous 8-bit bytes in the message with the value in the current register. Only the 8-bit data in each character is valid for CRC, and the start bit, stop bit and parity bit are invalid. During the CRC generation process, each 8-bit character is XORed with the register content alone, and the result moves toward the least significant bit, and the most significant bit is filled with 0. The LSB is extracted for detection. If the LSB is 1, the register is XORed with the preset value alone. If the LSB is 0, it is not performed. The whole process is repeated 8 times. After the last bit (the 8th bit) is completed, the next 8-bit byte is XORed with the current value of the register alone. The final value in the register is the CRC value after all bytes in the message are executed.

When CRC is added to the message, the low byte is added first, then the high byte. The CRC simple function is as follows:

```
unsigned int crc_chk_value (unsigned char *data_value, unsigned char length)
{
  unsigned int crc_value=0xFFFF;
  int i;
  while (length--)
    {
       crc_value^=*data_value++;
       for (i=0;i<8;i++)
       {
           if (crc_value&0x0001)
           {
               crc_value= (crc_value>>1) ^0xa001;
           }
          else
           {
               crc_value=crc_value>>1;
          }
       }
   }
   return (crc_value) ;
```

}

4. Address definition of communication parameters

Read and write function code parameters (some function codes cannot be changed and are only for manufacturer use or monitoring):
The rule of using function code group number and label as parameter address is as follows:
High byte: F00 to FFF (F group), d00 (d group)
Low byte: 00 ~ FF
For example: if you want to range function code F00.20, the access address of the function code is expressed as 0xA014 ;
Notice:
Some parameters cannot be changed when the inverter is in operation; some parameters cannot be changed regardless of the inverter state; when changing function code parameters, pay attention to the parameter range, unit and related instructions.

Function code group number	Communication access address	Communication modifies the function code address in RAM
F00~F15 Group	0xA000 ~ 0xAFFF	0x4000 to 0x4FFF
F16~F18	0xB000 to 0xB2FF	0x5000 to 0x52FF
FFF Group	0xBF00 to 0xBFFF	0x5F00 to 0x5FFF
D00 Group	0x7000 to 0x70FF	

Note that since EEPROM is frequently stored, the service life of EEPROM will be reduced. Therefore, some function codes do not need to be stored in the communication mode. You only need to change the value in RAM.

5. Shutdown/operation parameters:

Parameter address	Parameter Description	Parameter address	Parameter Description
1000H	* Communication setting value (decimal) -10000 ~ 10000	1010H	PID Settings
1001H	Operating frequency	1011H	PID Feedback
1002H	Bus voltage	1012H	PLC Steps
1003H	Output voltage	1013H	PULSE Input pulse frequency, unit 0.01kHz
1004H	Output Current	1014H	Feedback speed, unit: 0.1Hz
1005H	Output Power	1015H	Remaining running time
1006H	Output torque	1016H	AI1 voltage before correction

1007H	Running speed	1017H	AI2 voltage before correction
1008H	Digital input terminal input symbol	1018H	Panel potentiometer voltage before calibration
1009H	Digital output terminal output mark	1019H	Line speed
100AH	AI1 voltage	101AH	Current power-on time
100BH	AI2 voltage	101BH	Current running time
100CH	Panel potentiometer voltage	101CH	PULSE input pulse frequency, unit 1Hz
100DH	Count value input	101EH	Actual feedback speed
100EH	Length value input	101FH	Main frequency A display
100FH	Load speed	1020H	Auxiliary frequency B display

Notice:

The communication setting value is a percentage of the relative value, 10000 corresponds to 100.00%, -10000 corresponds to -100.00%.

Control command input to the inverter: (write only)

Command word address	Function
2000H	0001: Forward operation
	0002: Reverse operation
	0003: Forward jog
	0004: Reverse jog
	0005: Free stop
	0006: Deceleration and stop
	0007: Fault reset

Read inverter status: (read only)

Status word address	Status word function
3000H	0001: Forward operation
	0002: Reverse operation
	0003: Shutdown

Parameter lock password verification: (If the return value is 8888H, it means the password verification has passed)

User password address	Enter the password content
AF00H	*****

Digital output terminal control: (write only)

Command address	Command content
2001H	BIT0: Y1 output control BIT1: Y2 output control BIT2: R1 output control BIT3: R2 output control

Analog output AO1 control: (write only)

Command address	Command content
2002H	0 to 7FFF represents 0% to 100%

Analog output AO2 control: (write only)

Command address	Command content
2003H	0 to 7FFF represents 0% to 100%

Pulse (PULSE) output control: (write only)

Command address	Command content
2004H	0 to 7FFF represents 0% to 100%

5、Inverter fault description:

Inverter fault address	Inverter fault information

8000H	0000: No fault 0001: Reserved 0002: Acceleration overcurrent 0003: Deceleration overcurrent 0004: Constant speed overcurrent 0005: Accelerating overvoltage 0006: Deceleration overvoltage 0007: Constant speed overvoltage 0008: Buffer resistor overload fault 0009: Undervoltage fault 000A: Inverter overload 000B: Motor overload 000C: Input phase loss 000D: Output phase loss 000E: Module overheated 000F: External fault 0010: Communication abnormality 0011: Reserved 0012: Current detection failure	0013: Motor tuning failure 0014: Reserved 0015: Parameter read and write exception 0016: Inverter hardware failure 0017: Reserved 0018: Reserved 0019: Reserved 001A: Running time reached 001B: User-defined fault 1 001C: User-defined fault 2 001D: Power-on time reached 001E: Load lost 001F: PID feedback lost during operation 0028: Fast current limiting timeout fault 002A: Speed deviation is too large 005C: Initial position error 0041: Photovoltaic water shortage detection fault

6. Meaning of error code when slave responds to abnormal information:

Error code address	Error Code	illustrate
8001H	01H	Wrong password
	02H	Read and write command errors
	03H	CRC check error
	04H	Invalid address
	05H	Invalid parameters
	06H	Invalid parameter change
	07H	System Lock
	08H	Storing parameters

Appendix 2: Macro parameter setting instructions

Function macro definition	Setting parameters	Automatically modify parameter list	Debugging steps
One variable frequency pump + two industrial frequency pumps (one variable frequency pump + two industrial frequency pumps) water supply mode 1	F00.00=1	F00.03=10; F14.02=11; F14.03=80; F14.04=2002; F14.05=11; F14.06=11; F07.00=53; F07. 01=54; F07.02=55; F07.03=56; F07.04=57; F07.05=58; F08.02=42; F08.03=43; F08.04=44; F09.00=7;F16.27=20.00.	Step 1: Determine the sensor feedback type. AI1 and AI2 default to input voltage feedback signals at the factory. You can also select AI1 input current feedback signal through jumper JP3. Step 2: Terminal wiring, if the pressure gauge has a 0-10V output, connect the pressure gauge signal line to AI1, and the other two lines to +10V and GND; if the output is 0-20mA, short-circuit COM and GND, connect the pressure gauge signal line to AI1, and the other line to 24V. For other terminal wiring, see Appendix 3 (Three-pump Circulation Soft Start Water Supply Parameter Description). Step 3: Parameter initialization (F15.01=2); Step 4: Set the sensor range (F16.09); Step 5: Function macro selection (F00.00=1 or 2) Step 6: Set the target pressure, which can be set through parameter F16.08 or by using the up and down keys on the keyboard. Step 7: According to the on-site water usage, energy saving can be achieved by adjusting F16.27 (water pump sleep frequency).
Three-pump circulation soft start (3 variable frequency pumps) water supply mode	F00.00=2		
One variable frequency pump + three industrial frequency pumps (1 variable frequency pump + 3 industrial frequency pumps) water supply mode	F00.00=3	F00.03=10; F14.02=11; F14.03=80; F14.04=2002; F14.05=11; F14.06=11; F08.02=42; F08.03=43; F08.04=44; F09.00=7; F16.27=20.00.	Step 1: Determine the sensor feedback type. AI1 and AI2 are factory default input voltage feedback signals. You can also select AI1 input current feedback signal through jumper JP3. Step 2: Terminal wiring. If the pressure gauge has a 0-10V output, connect the pressure gauge signal line to AI1, and the other two lines to +10V and GND. If the output is 0-20mA, short-circuit COM and GND, connect the pressure gauge signal line to AI1, and the other line to 24V. Step 3: Parameter initialization (F15.01=2); Step 4: Set the sensor range (F16.09); Step 5: Function macro selection (F00.01=3, 4, 5, 6);

One variable frequency pump + two industrial frequency pumps (one variable frequency pump + two industrial frequency pumps) water supply mode 2	F00.00=4	F00.03=10; F14.02=11; F14.03=80; F14.04=2002; F14.05=11; F14.06=11; F08.02=42; F08.03=43; F09.00=7; F16.27=20.00.	Step 6: Set the target pressure, which can be set through parameter F16.08 or by using the up and down keys on the keyboard. Step 7: According to the on-site water usage, energy saving can be achieved by adjusting F16.27 (water pump sleep frequency). Note: When F00.01=3, 4, 5, 6, there is no need to connect the interlocking circuit, and the contactor can be controlled through the main control board relay and Y terminal.
One variable frequency pump and one industrial frequency pump (one variable frequency pump + one industrial frequency pump) water supply mode	F00.00=5	F00.03=10; F14.02=11; F14.03=80; F14.04=2002; F14.05=11; F14.06=11; F08.02=42; F09.00=7; F16.27=20.00.	
Single pump water supply (1 variable frequency pump) mode	F00.00=6	F00.03=10; F14.02=11; F14.03=80; F14.04=2002; F14.05=11; F14.06=11; F09.00=7; F16.27=20.00.	
Photovoltaic water supply voltage tracking mode	F00.00=7	F00.03=11.	Step 2: Parameter initialization (F15.01=2); F00.03=11. Step 3: Function macro selection (F00.00=7, 8, 9). Note: For photovoltaic water supply, refer to F16.10 ~ F16.26.
Photovoltaic water supply power and VF mode	F00.00=8		

Photovoltaic water supply power tracking SVC mode	F00.00=9		

Appendix 3: Three-pump circulation soft start water supply parameter description

Function code	name	Setting range	Factory settings	Change
F 00 . 00	Function macro definition	0: General mode 1: One variable frequency pump and two industrial frequency pumps (1 variable frequency pump + 2 industrial frequency pumps) water supply mode 1 2: Three-pump circulation soft start (3 variable frequency pumps) water supply mode	0	×
F00.02	Command source selection	1: Terminal operation command channel	0	×
F00.03	Main frequency source selection	10: Multi-pump instruction	0	×
F07.00	Input terminal X1 function	53: Start/Stop 54: Run allowed 55: Interlock 1 56: Interlock 2 57: Interlock 3 58: PFC start/stop	53	×
F07.01	Input terminal X2 function		54	×
F07.02	Input terminal X3 function		55	×
F07.03	Input terminal X4 function		56	×
F07.04	Input terminal X5 function		57	×
F07.05	Input terminal X6 function		58	×
F07.06	Input terminal X7 function		0	×

F 08 . 02	Programmable relay R1 output	42 : Interlock 1 output 43 : Interlock 2 output 44 : Interlock 3 output	42	×
F 08 . 03	Programmable relay R2 output		43	×
F 08 . 04	Open collector Y1 output function selection		44	×
F 08 . 05	Open collector Y 2 output function selection		0	×
F09.00	PID given source	0: F09.01 setting 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE pulse setting (X7) 5: Communication setting 6: Multi-segment instruction setting	0	☆
F09.01	PID value given	0.0% ～ 100.0%	50.0%	☆
F09.02	PID feedback source	0: AI1 1: AI2 2: Keep 3: AI1-AI2 4: PULSE pulse setting (X7) 5: Communication setting 6: AI1+AI2 7: MAX(|AI1|, |AI2|) 8: MIN(|AI1|, |AI2|)	0	☆
F09.03	PID action direction	0: Positive effect 1: Counteraction	0	☆
F09.04	PID given feedback range	0 ~ 65535	1000	☆
F09.05	Proportional gain Kp1	0.0 ～ 100.0	20.0	☆
F09.06	Integration time Ti1	0.01s ～ 10.00s	2.00s	☆
F09.07	Derivative time Td1	0.000s ～ 10.000s	0.000s	☆
F09.08	PID reverse cut-off frequency	0.00 ~ Maximum frequency	2.00Hz	☆
F09.09	PID deviation limit	0.0% ～ 100.0%	0.0%	☆

F09.10	PID differential limiting	0.00% ～ 100.00%	0.10%	☆
F09.11	PID given change time	0.00 ～ 650.00s	0.00s	☆
F09.12	PID feedback filter time	0.00 ～ 60.00s	0.00s	☆
F09.13	PID output filter time	0.00 ～ 60.00s	0.00s	☆
F09.26	PID feedback loss detection value	0.0%: No feedback loss is determined 0.1% ～ 100.0%	0.0%	☆
F09.27	PID feedback loss detection time	0.0s ～ 20.0s	0.0s	☆
F16.00	Terminal connection and disconnection delay	0.0～6000.0s	0.1	☆
F16.01	Polling time	0.0～6000.0h	48.0	☆
f/16.02	Pump reduction lower frequency	0.0～600.00HZ	35.00	☆
f/16.03	Pump delay time	0.0～3600.0s	5.0	☆
f/16.04	Pump reduction delay time	0.0～3600.0s	5.0	☆
f/16.05	Pump sleep waiting time	0.0～3600.0s	2.0	☆
f/16.06	Water pump wake-up waiting time	0.0～3600.0s	1.0	☆
f/16.07	Water pump wake-up pressure point	(0.0～100.0%)*（F16.08）	80.0%	☆
f/16.08	Preset pressure	0.00～F16.09（MPa，Kg）	5.00	☆
f/16.09	Pressure gauge range	0.00～100.00（MPa、Kg）	10.00	☆

1. Instructions for use of one-change-two-function water supply mode 1 and three-pump circulation soft start water supply mode :

1、**One-in-two-in-one water supply mode 1** is that the inverter only starts the first inverter speed regulation, and the others are directly connected to the power grid.

2、**The three-pump circulation soft-start water supply mode** is that the frequency converter starts each unit, and delays connecting to the power grid after starting; the first one started is connected to the power grid, and the later one is used for speed regulation.

二、The use of external terminals and the working process of the addition and subtraction pump are as follows:

1、input terminals X1 to X6 are fixed at the factory.

When F00.00 selects 1 or 2, input terminals X1 to X6 are fixed to their water supply function.

2、Corresponding relationship between X terminal, Y terminal and relay

When X3 is short-circuited with COM, it corresponds to interlock 1 output No. 42 in F08.02 ~ F08.05, which is referred to as pump No. 1 for the sake of convenience; when X4 is short-circuited with COM, it corresponds to interlock 2 output No. 43 in F08.02 ~ F08.05, which is referred to as pump No. 2; when X5 is short-circuited with COM, it corresponds to interlock 3 output No. 44 in F08.02 ~ F08.05, which is referred to as pump No. 3.

3、Differences between X1 and X6

X1 and X6 cannot be turned on at the same time. X1 is manual start and stop control. Only one pump can be turned on at a time. The frequency is given by AI1 and no PID adjustment is performed. X6 is start and stop control in multi-pump water supply mode and PID adjustment is performed.

4. Manual control of the pump start and stop process

After X1 and COM are short-circuited, the order of pump startup is that the first pump to be put into operation starts first, and the pumps that are put into operation together start smaller. For example, after only X5 is connected, only pump No. 3 is started; if X4 and X5 are connected at the same time, only pump No. 2 is started; if X3, X4 and X5 are connected at the same time, only pump No. 1 is started.

5. Working process of multi-pump water supply mode

After X6 and COM are short-circuited, the order of pump startup is that the first one put into operation starts first, and the ones put into operation together start smaller, and PID control is performed.

(1) When F00.01=1 (one variable two working water supply mode 1 is valid), if all three water pumps are put into use, after the system is powered on, pump No. 1 is connected first and the variable frequency pump No. 1 is started. When the working frequency of variable frequency pump No. 1 reaches 50Hz, the pump adding time (F16.03) is delayed. If the measured pressure does not reach the system set pressure, the industrial frequency pump No. 2 is connected. When the working frequency of variable frequency pump No. 1 reaches 50Hz again, the pump adding time (F16.03) is delayed. If the measured pressure still does not reach the system set pressure, the industrial frequency pump No. 3 is connected. At this time, pump No. 1 is in variable frequency working state, and pumps No. 2 and No. 3 are in industrial frequency working state. If the measured pressure is greater than or equal to the system set pressure, the operating frequency of the No. 1 variable frequency pump drops to the lower limit frequency of the pump reduction (F16.02), and after the pump reduction delay (F16.04), the No. 3 industrial frequency pump will be disconnected. If the measured pressure is still greater than or equal to the system set pressure, and the operating frequency of the No. 1 variable frequency pump is less than or equal to the lower limit frequency of the pump reduction (F16.02), after the pump reduction delay (F16.04), the No. 2 industrial frequency pump will be disconnected, and finally only the No. 1 variable frequency pump will be working.

(2) When F00.01=2 (three-pump circulation soft start mode is valid), if all three water pumps are put into operation, after the system is powered on, pump No. 1 is connected first to start the variable frequency operation of pump No. 1. When pump No. 1 is working at 50Hz,

after the pump delay (F16.03), if the measured pressure does not reach the system set pressure, pump No. 1 is disconnected, and pump No. 2 and power frequency pump No. 1 are connected. At this time, pump No. 1 is converted from variable frequency state to power frequency state, and pump No. 2 is in variable frequency working state. When pump No. 2 is working at 50Hz, after the pump delay (F16.03), if the measured pressure still does not reach the system set pressure, pump No. 2 is disconnected, and pump No. 3 and power frequency pump No. 2 are connected. At this time, pump No. 2 is converted from variable frequency state to power frequency state, pump No. 3 is in variable frequency working state, and pump No. 1 is still in power frequency working state. When the operating frequency of pump No. 3 drops to the lower limit frequency of pump reduction (F16.02), after the pump reduction delay (F16.04), if the measured pressure is greater than or equal to the system set pressure, the No. 1 industrial frequency pump will be disconnected; when the operating frequency of pump No. 3 is less than or equal to the lower limit frequency of pump reduction (F16.02), after the pump reduction delay (F16.04), if the measured pressure is still greater than or equal to the system set pressure, the No. 2 industrial frequency pump will be disconnected; finally, only the No. 3 variable frequency pump will work.

Note: If one-to-three is required, all three pumps will be put into operation; if one-to-two is required, any two pumps can be selected to be put into operation; if one-to-one is required, any one pump can be selected to be put into operation; all are based on the rule that the first pump put into operation will be started first, and the pumps put into operation together will be smaller.

6、Terminal connection and disconnection delay

a delay in the connection and disconnection of the contactor terminals, the signals are not synchronized. The terminal input disconnection delay (F16.00) is required to adjust

7、Terminal Description

X2 is the operation permission terminal, which is connected to the normally closed point of the external fault relay. It is generally connected to the external water shortage or high voltage signal control. If there is no external fault detection, it needs to be short-circuited with COM.

三、Application of STOP/RST key

1、The factory default value of F14.01 is 3, that is, the STOP/RST key is valid in the terminal control operation mode. If the keyboard is used to stop the machine, it is necessary to reconnect the X2 and X6 terminals or power on again to work normally.

2、When F14.01=0, the STOP/RST key is invalid in terminal control, and only the inverter fault is reset. Generally, F14.01 is set to 0 to prevent the keyboard from shutting down due to accidental operation. It is necessary to reconnect the X2 and X6 terminals or power on again to work normally.

三、Working process when there is a failure in water supply

1、If the variable frequency pump has an external fault, stop the faulty pump first, and then switch the next larger industrial frequency pump to the variable frequency pump. For example, pumps 1, 2, and 3 are all turned on, pump 2 is a variable frequency pump, and pumps 1 and

3 are both industrial frequency. If a frequency converter fault occurs, stop pump 2 first, and then switch the industrial frequency pump 3 to the variable frequency pump, while pump 1 continues to operate at industrial frequency. If the external fault of pump 3 is resolved, it can be put into use normally.

2、If the frequency conversion pump has an internal fault, all pumps will stop, and the frequency conversion fault will be reset with the keyboard to restore normal working state.

四、Function settings.

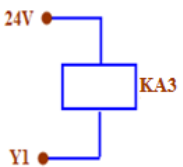
1、If you want to turn on the water supply function, you need to set F00.00 to option 1 or 2. For specific selections, please refer to the manual.

2、To enable the PID function, set F00.03=10, and then set the required PID parameters in group F09. See the manual for details.

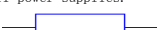
3、If F14.01 is set to 0, the keyboard stop key is invalid.

五、Water supply wiring diagram (refer to ABB's inverter ACS510 constant pressure water supply wiring diagram).

1、Schematic diagram of open collector Y1 connected to relay:



2. Introduction to wiring diagram symbols

In the following Figures 1 and 2, **L1** and **L2** represent coil power supplies. Indicates the normally closed terminal, indicates the normally open terminal,  Indicates the coil.

Indicates the

normally open point of relay KA1 (controlled by R1 on the main board) ,

indicates the normally open point of relay KA2 (controlled by R2 on the main board),

indicates the normally open point of relay KA3 (controlled by Y1 on the main board); KM1, KM2 and KM3 are contactors that control variable frequency pumps No. 1, No. 2 and No. 3 respectively, and KM11, KM21 and KM31 are contactors that control power frequency pumps No. 1, No. 2 and No. 3 respectively. **(Note: Figures 1 and 2 below are only sketch logic diagrams. If you need a fault relay or indicator light, add it yourself)**

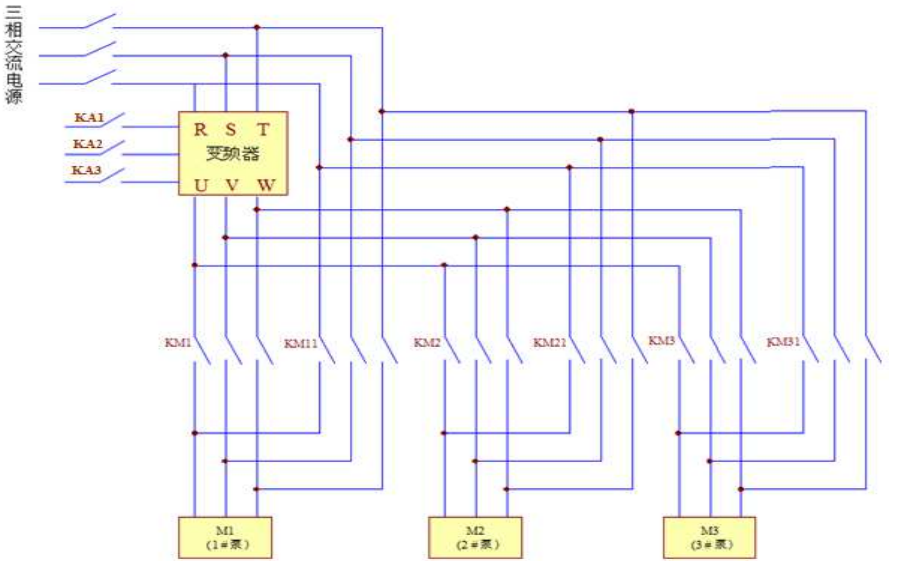
3. Introduction to contactor interlocking and self-locking (as shown in Figure 1)

When KM1 is connected, KM11, KM2 and KM3 cannot be connected.
When KM11 is connected, KM1 cannot be connected.
When KM2 is connected, KM21, KM1 and KM3 cannot be connected.
When KM21 is connected, KM2 cannot be connected.
When KM3 is connected, KM31, KM1 and KM2 cannot be connected.
When KM31 is connected, KM3 cannot be connected

Figure 1:

KA1
KM2
KM3
KM11
KM1
KM2
KM3
KM11
KM1
KM11
L1
KA2
KM1
KM3
KM21
KM2
KM1
KM3
KM2
KM21
KA3
KM1
KM2
KM31
KM3
KM1
KM2
KM3
KM31
L2

Figure 2:


三相交流电源
KA1
KA2
KA3
R S T
变频器
U V W
KM1
KM11
KM2
KM21
KM3
KM31
M1
(1#泵)
M2
(2#泵)
M3
(3#泵)

Warranty Agreement

1. The warranty period of this product is twelve months (subject to the barcode information on the body). During the warranty period, if the product fails or is damaged under normal use according to the instruction manual, our company will be responsible for free repair.

2 During the warranty period, if the damage is caused by the following reasons, a certain repair fee will be charged:

A. Damage to the machine caused by incorrect use or unauthorized repair or modification;
B. Machine damage caused by fire, flood, voltage abnormality, other natural disasters and secondary disasters;
C. Hardware damage caused by dropping or transportation after purchase;
D. Machine damage caused by failure to operate according to the user manual provided by our company;
E. Failure and damage caused by obstacles other than the machine (such as external equipment factors);

3. When the product fails or is damaged, please fill in the contents of the "Product Warranty Card" correctly and in detail.

4. The collection of maintenance fees shall be based on the latest "Maintenance Price List" adjusted by our company.

5. This warranty card will not be reissued under normal circumstances. Please be sure to keep this card and show it to the maintenance personnel during warranty service.

6 If you have any questions during the service, please contact our agent or our company in time.

Product warranty card

<table>
<tr><td rowspan="3">Customer Information</td><td colspan="2">Unit Address:</td></tr>
<tr><td rowspan="2">Company Name:

postal code:</td><td>Contact:</td></tr>
<tr><td>Contact Number:</td></tr>
<tr><td rowspan="3">Product Information</td><td colspan="2">Product Model:</td></tr>
<tr><td colspan="2">Body barcode (paste here):</td></tr>
<tr><td colspan="2">Agent Name:</td></tr>
<tr><td>Fault Information</td><td colspan="2">(Maintenance time and content):</td></tr>
</table>